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VOLUME IX JANUARY, 1925 No. 1

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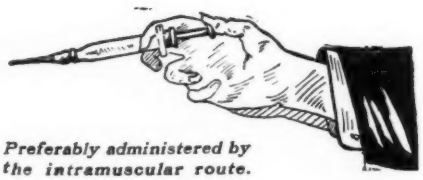

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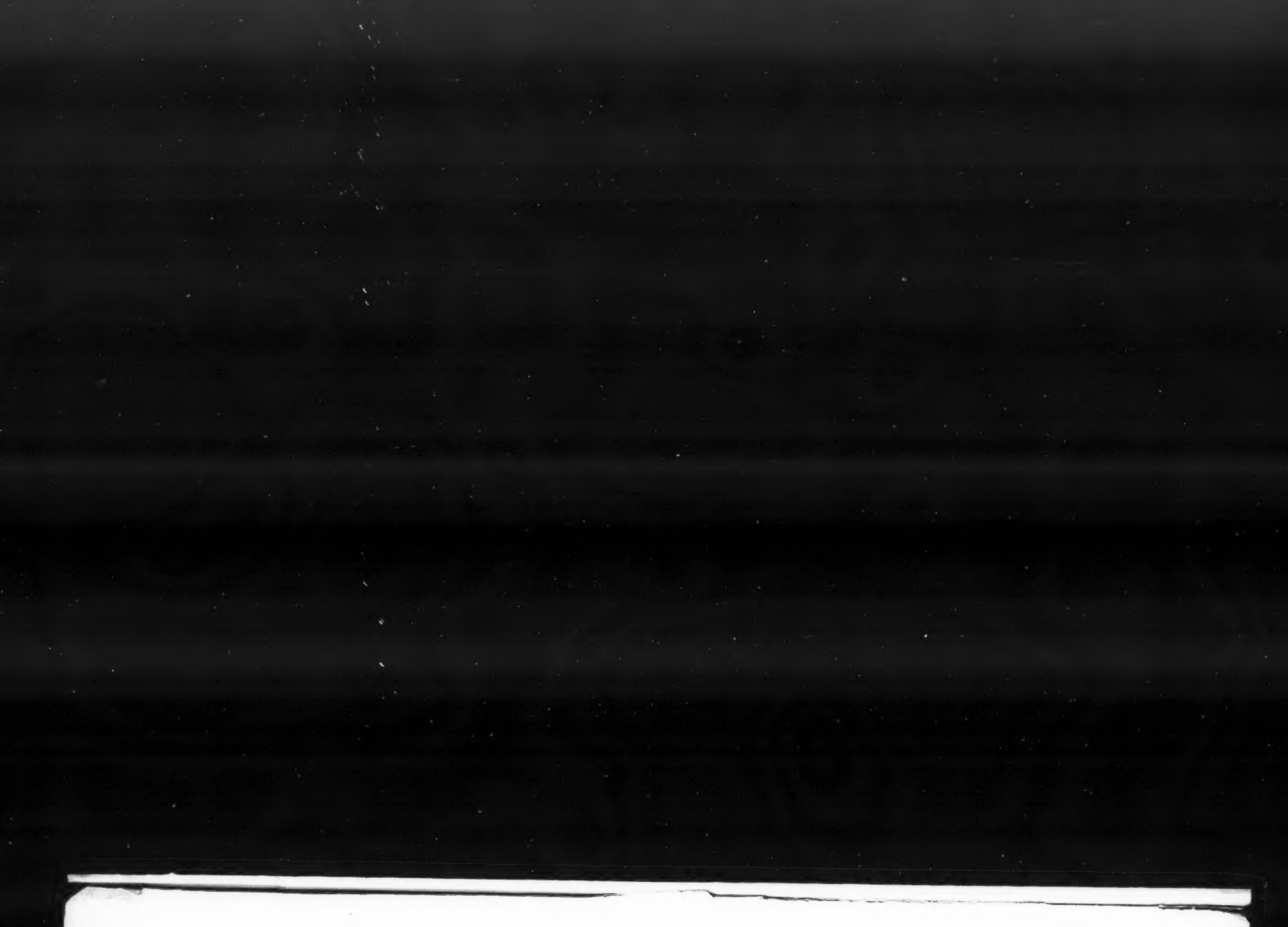

SPECIAL TUBERCULOSIS NUMBER

Southwestern Medicine

PUBLISHED MONTHLY

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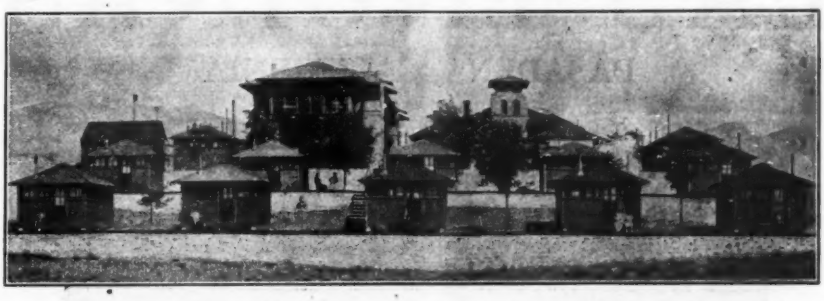

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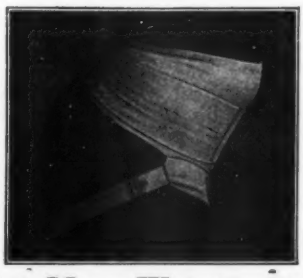

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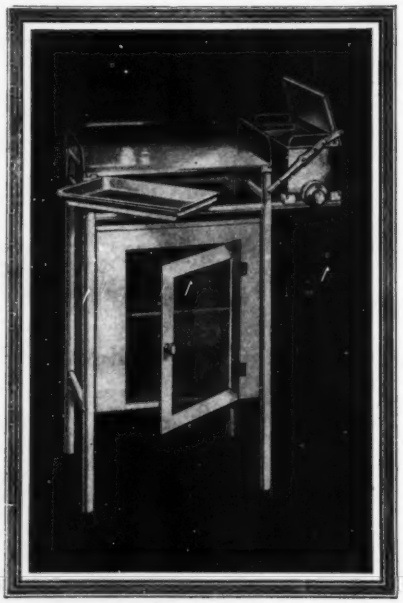

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MECHANICAL PROBLEMS IN ADVANCED PULMONARY TUBERCULOSIS*

BY ORVILLE EGBERT, M. D.
EL PASO, TEXAS

*(*Read before the Tenth Annual Meeting of the Medical & Surgical Association of the Southwest, held at Phoenix, Arizona, November 6 to 8, 1924.)*

It is with some misgiving that we dare to place emphasis on mechanical problems in pulmonary tuberculosis, for the problem suggests the answer. Obviously, meet a mechanical problem with mechanics. Someone has written: "We shudder to think of the sanatorium being invaded by the surgeon." But tuberculosis has had humanity shuddering for centuries and one shudder more or less does not seem valid reason for abandoning consideration of pulmonary tuberculosis from a mechanical hypothesis.

Febrile tuberculosis manifesting itself by pulmonary infiltration, in the light of existing knowledge, is a hygienic problem pure and simple. Not only is intensive hygienic treatment essential, but our conservative students seem to go further and advise that anything other than hygiene is contraindicated. But when the advanced stage of pulmonary tuberculosis is reached we have a far different picture. Recall briefly the pathology in advanced pulmonary tuberculosis.

The parenchyma in varying degrees is destroyed, and is replaced by fibrous tissue. Again, nature in her effort to wall off the infiltrating process devitalizes the area, or we have multiple small areas of necrosis coalescing, either process resulting in excavation. These cavities vary in size from ever so small to cavities consuming an entire lobe and even the entire lung. They may exist as single, multiple or multilocular cavities. Because the tubercle bacillus shows elective action for upper lobes, the great majority of cavities occur there. The walls of these cavities may be cauliflower-like with practically no walling by fibrous changes. Others have moderately thick fibrous walls but without sufficient density to produce much rigidity. Still others have dense, fibrous walls, or calcified walls, that would resist efforts at collapse or would fail to heal even if the collapse was forced.

The next pathology of importance in advanced pulmonary tuberculosis, and the one standing in the way of successful attack on the cavity, is pleuritis. The chronicity of pulmonary tuberculosis coupled with the occasional acute exacerbations go to produce marked pleuritic changes in nearly every case. The visceral pleura in the region of the cavity is always thickened and adhesions to the parietal pleura are usually so extensive that the pleural space is absolutely obliterated. The acute exacerbations have usually extended the pleuritis from the original focus to the rest of the pleura so that there exist pleuritic adhesions over areas of the lung whose parenchyma is not necessarily infiltrated.

These pleuritic changes coupled with cavitation changes, particularly when unilateral, often distort the position of the thoracic viscera. The contraction of the lung incident to extensive fibrosis and cavitation, when adhered to the parietal walls, drags the medaistinal contents to the affected side. It is also conducive to compensatory changes on the part of the better lung, it often becoming greatly enlarged and emphysematous.

We shall not attempt to deal in this paper with complications such as infected pneumothorax, empyema, et cetera, where other therapeutic agents supersede or conjoin with mechanical efforts.

Now a few points of anatomy and physiology which we must take true cognizance of, along with pathology, to produce a true mechanical hypothesis in our consideration of advanced tuberculosis. The lung is suspended in the rigid bony thorax for two reasons; protection of a vital organ and to resist the atmospheric pressure making it possible for the intrapulmonary pressure to increase in the act of inspiration. Another point to consider relative to the bony thorax; the first rib circumventing the apex is short, thick, not twisted upon itself and is rigid and almost motionless in the respiratory act.

Suspended in this bony thorax are two multilobar, soft, highly vascular, air containing, ever moving lungs. Each qualification is significant. Suspended in the bony thorax the lungs resist external pressure, atmospheric or otherwise. Remove the bony protection and they collapse. Being one of the paired organs makes it possible for life to exist on one lung. The lungs being multilobar is of the same advantage as being bilateral. In truth we have five lungs and the multiplicity of the lobes suggests conservation of the unaffected lobes in tuberculosis. The fact that the lung is soft and elastic makes possible expansion and contraction and makes possible intrathoracic collapse. Being air containing, collapse of the lung means collapse of the alveoli. Retain the collapse a sufficient length of time and the alveoli are destroyed; the lung may reexpand and be air containing, but few, if any, of the alveoli return to function. This suggests conservation of all normal functioning lung and a hesitation to collapse a normal lower lobe in our effort to obliterate upper lobe trouble. The great vascularity of the lung which contains several times its own weight in blood carries always a great danger of hemorrhage where any ulcerative process is present. This great amount of blood contained in the lungs suggests a stasis accentuated by gravity. Could it be possible that the lower lobes are comparatively free from tuberculosis because of increased amount of blood due to gravity? This is possibly plausible when we consider that patients placed in bed on their backs a greater part of the time usually heal their lesions posteriorly before they do the anterior involvement. The fact that the lungs in their normal function are ever in motion is one of the most important reasons why tuberculosis so successfully attacks the lung. Those organs or structures that can be placed in absolute rest readily heal, but the lung rest is only a relative state unless placed at absolute rest by some mechanical interference.

The most important agent in the respiratory cycle is the diaphragm which domes itself into the thoracic cavity to lessen that cavity's space thereby compressing the lung. The phrenic nerve which supplies it, when paralyzed will cause the hemisphere of the diaphragm on that side to ascend permanently into its half of the chest thereby producing a permanent partial collapse of the lung

In a series of twenty autopsies done by the Clinical and Pathological Society of El Paso upon cases dying of advanced tuberculosis the following was noted:

In every case there was a cavity of an upper lobe.

In two cases there were bilateral cavities.

In six cases there were multilocular cavities.

In every case there was a total obliteration of the pleural space surrounding the upper lobe where the cavity was.

In one-half the cases the lower lobes were not extensively infiltrated with tubercles, and adhesions over the lower lobes were few and delicate.

In six cases the sheets of adhesions were so dense over the lower lobes, including attachments to the diaphragm, that the lungs were delivered only after cutting and tearing lung tissue.

In three cases there was a total obliteration of the pleural space on that side.

In twelve cases the pleura was from one-eighth to three-eighths of an inch thick.

In one case that had been treated with artificial pneumothorax the uninvolved lower lobe was totally collapsed and a cavity at the apex was intact due to the obliteration of the pleura about the cavity and to five guy-rope type adhesions, two attached to the diaphragm and three to parietal wall.

From these autopsies we feel justified in concluding that cavitation and advanced tuberculosis are practically synonymous, and because of adhesions and pleura obliteration intrathoracic collapse, either from artificial pneumothorax or phrenocotomy sufficient to close the cavity would be possible in very few cases. That artificial pneumothorax would be totally impossible in fifty percent of cases. That, when pos-

sible, it would most often collapse the lower lobes which are usually uninvolved or only moderately so and leave the cavity intact, thereby doubly working to the patient's disadvantage.

Though we recognize the fact that artificial pneumothorax is effective in a small percent of cases and worthy of a trial, yet we minimize its importance as an effective means of meeting the mechanical problems in advanced pulmonary tuberculosis.

We further conclude that thoracoplasty is indicated in cases of unilateral tuberculosis in which the lower as well as the upper lobes are involved, such as cases with multiple or multilocular cavitation, cavitation with extensive lower lobe infiltration, and those with marked pleural changes.

These two measures, artificial pneumothorax on the early end of advanced tuberculosis and thoracoplasty on the late end of advanced tuberculosis, and indicated in unilateral disease, means that from the great number of advanced cases we can subtract possibly five percent to which we have something effective to offer.

The pertinent fact confronting us in the other ninety-five percent is a bilateral tuberculosis with one lung markedly worse than the other, containing an upper lobe cavity with lower lobes uninvolved or only moderately so. We must mechanically obliterate that cavity and, at the same time, conserve the lower lobe if we are to effectively benefit the patient.

Webb, et al, have compressed the lung by sacks of shot or twenty-three hours a day rest on the affected side. This makes a small appeal because of the rigidity of adult ribs but is quite effective in children.

Pneumolysis is one of the most favored of the conservative procedures. In extrapleural pneumolysis the rib is resected, Alexander preferring the posterior to anterior operation, the parietal pleura is stripped from the chest wall and a "fill" of fat, pectoral graft, paraffine lumps or gauze placed in the prepared field to produce obliterative pressure on the cavity. Intrapleural pneumolysis is a technic preferred by some operators in which the adhering pleura is separated by open dissection and the "fill" then introduced.

Jacobaeus introduces two cannulae into the chest; through one he is able to see the adhesion cords that he severs, by cautery, through the other. This makes artificial pneumothorax successful in cases held down by a few cord like adhesions.

Sauerbruch, Jessen, Stocklin, and others, advocate open drainage of cavities that drain poorly and are producing absorption. Gekler has opened several cavities for the two-fold purpose of drainage and sterilization by chemical agents which excite granulation closing.

In a recent article, Schlaepfer shows experimentally the possibility of ligation of the pulmonary artery together with phrenocotomy producing complete arrest of function and fibrosis.

From these ingenious procedures we cannot but be impressed with the attack, from a surgical view point, upon the cavity and the effort to conserve functioning lung. The results already obtained and the proper recognition of the mechanical problem presented by advanced tuberculosis are sufficient to give us courage to study the problem more closely, and, in the choosing of our cases, to add cautiously a greater number to the list that surgery might have something to offer. Already such men as Sauerbruch, Bauer and Alexander are urging operative procedure earlier than has heretofore been attempted.

As a rule the internist is a poor mechanic, and this is a plea to him to appreciate more fully that advanced tuberculosis is a mechanical problem. Further we would urge the surgeon to make a more careful study of pulmonary tuberculosis which he has hitherto regarded strictly as the internist's field. His is the mechanical field and the internist needs his sympathetic cooperation.

We close with three brief case reports, each case showing a mechanical method of cavity obliteration.

Mrs. H. D. N., age 24. Two years ago her condition was advanced tuberculosis, left lung multiple cavitation, one large cavity, marked fibrosis. Right lung, fibrosis and calcification indicating extensive healed tuberculosis. At this time, after receiving prolonged treatment from artificial pneumothorax, she has total collapse of left lung including cavities.

M. G., female, age 13. Six months ago advanced pulmonary tuberculosis with large upper lobe cavity and marked fibrous changes. Small amount infiltration upper lobe of right. After three months of hygienic care there was marked improvement but cavity was still intact. A four-pound sack of shot was placed on chest over cavity which she has consistently worn since, with the result that the cavity is now replaced by marked fibrosis.

F. K., age 46. Advanced pulmonary tuberculosis sixteen years standing. Condition three months ago: Right lung remarkably clear of any tuberculosis. Left, greatly thickened pleura throughout with large multiple cavities, parenchyma apparently destroyed. Frequent hemorrhages. Was raising from 100 to 300 cc sputum daily. First stage thoracoplasty three months ago removing from tenth to fifth ribs inclusive. Second operation three weeks ago. Present condition: temperature normal, no bleeding since first operation. Sputum one to four cc daily. Gain in weight of fifteen pounds. Cavity apparently obliterated.

HELIOTHERAPY IN TUBERCULOSIS

A Scheme for Proper Selection of Cases, with a Word About Technique*

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Sunlight therapy, solar therapy, heliotherapy, are terms heard and seen with increasing frequency each year since 1913. Before that date they were practically nonexistent in the medical literature of the United States, although they had been fairly common in foreign medical literature for a period beginning about ten years prior to 1913. Rollier alone, during that ten year period, published more than a dozen articles. However, in spite of the favorable reports on heliotherapy by various foreign writers, practically no notice was given it in this country until after the publication of Rollier's profusely illustrated book, "Die Heliotherapie der Tuberculose," which appeared in 1913. Since that date, each year has seen more interest taken in it by American doctors until now one might almost say that it is the style in therapeutics. Heliotherapy is, unquestionably, a very valuable therapeutic agent in carefully selected cases, but it is being used too generally by doctors. Even patients, themselves, are using it without medical or any other kind of supervision. It is because of this unusual interest in it which is now being shown, that it is believed the time has arrived to re-emphasize that great caution must be used in employing it; otherwise, an important agent in the treatment of certain types of tuberculosis will, ultimately, be thrown in the discard by a good many doctors, particularly, so far as pulmonary tuberculosis is concerned. It is my firm conviction from my own experience and observation of patients, as well as from information obtained in discussion with doctors, that, at the present time, many patients with tuberculosis are being given sun treatment who ought never under any circumstances to receive it, and that others who ought to receive it with benefit are being made worse by it. It seems certain that this state of affairs will never be corrected until decidedly more attention is paid to (1) a proper selection of cases, and (2) a proper technic. Upon these two provisions depends the successful use of heliotherapy. Since a plan has been evolved which it is believed will solve the first requirement, and because it is desired to make some suggestions concerning the second, this paper is written.

Sunlight in the treatment of disease is not a new thing. They say the father of history himself wrote of its use in the fifth century B. C., and, following him, other occasional writers of old have mentioned it up to and including the time of the Romans. After this period, however, nothing is heard of it again until the last two decades of the eighteenth century when it is recommended by several French writers for various conditions. About the middle of the nineteenth century, Bonnet of Lyons urged its use in bone and joint tuberculosis, and he was the first to emphasize the importance of the general sun bath in addition to its local use. In spite of Bonnet's recommendations, however, only casual interest was shown in solar therapy and that practically entirely by his immediate followers (notably Poncet and Ollier), until the last decade of the nineteenth century, when Finsen the Dane, with his scientific studies and the publication of his results, put its use on a solid foundation and aroused an international interest in it. Modern heliotherapy may really be said to have been born with the early work of Finsen, the results of which he first published in 1893. Following Finsen, current medical literature gives Bernhard of St. Moritz credit of first using sunlight in the treatment of infected wounds and so-called surgical tuberculosis in 1902, and then Rollier of Leysen, in 1903. Malgat of Nice is credited with being the first to use it in pulmonary tuberculosis, in 1904.

Without wishing to detract from the credit due any of these men, and credit is certainly due all of them, but desiring to see the sequence of events in the history of heliotherapy set forth as they actually occurred, I wish here to record the fact which, apparently, is not known to any of the writers, either native or foreign, who have written on heliotherapy, that the real pioneer, after Finsen, in heliotherapy, for surgical, as well as pulmonary tuberculosis, was an American doctor, living and practicing in Fort Dodge, Iowa, Dr. J. W. Kime, by name. Stimulated by Finsen's work on lupus, Dr. Kime was himself treating that

disease with sun in 1897 or 1898. He obtained excellent results, and reasoning that if sunlight was of value in skin tuberculosis, it ought to be valuable in other kinds, he began, in 1900, treating tuberculosis of the lymph glands and lungs. His interest was so intense that he did some research work on the penetration of light rays, and this part of his work has been acknowledged in literature. He also invented a large mirror made of blue glass, which cut out a large part of the heat rays and concentrated the blues and violets. His work so closely following Finsen, who assumed that all the valuable part of the spectrum was at the violet end (we think differently now), it was most reasonable that he should work along this line. Dr. Kime used his mirror to concentrate the rays on the part affected and, in addition, exposed the patient's body to the direct rays of the sun. He was enthusiastic about this work, and talked of it constantly.

In spite of knowing about Dr. Kime's work and hearing him talk about it on more than one occasion, the writer did not take any interest in heliotherapy, until after Rolliers first book appeared in 1913. What he had to say was so convincing, coming as it did on top of what was already known of Dr. Kime's work, that at last, a keen interest was awakened. A little later, hearing a doctor acquaintance who had visited Rollier's clinic, wax so enthusiastic about the results, this interest was so increased that the following year or so its use was begun on an occasional case. At first only on cases of uncomplicated, so-called surgical, tuberculosis, later on so-called surgical with pulmonary involvement, and still later, after getting good results in both these types of cases, it was tried out in pure pulmonary. At first in the pure pulmonary, having no guide except the warning of Rollier to proceed carefully when approaching the chest and avoid toxic cases with high fever, great caution was exercised, using it on but few cases. These cases were chosen for the sole reason that they were not improving. No effort was made to select them according to any rule, for none was known, but luck must have been with both doctor and patient, for enough good results were obtained in these uncomplicated lung cases to encourage its further use; so that, before long it was being used on an increasing number of patients, too many in fact, for one day it was realized that some cases under its use were getting worse. The determination accordingly followed to stop and see what was the matter. The first thought was about the technic, but after reviewing this carefully the conclusion was reached that technic was not the trouble. Rollier's insistence that one must develop a separate technic for each patient, according to the way he reacted to sun, had, from the beginning, made such an impression that it seemed sure the technic was all right, and then too the so-called surgical cases were all getting along well, even those with pulmonary involvement. As warned by Rollier, however, one had to be more careful in the latter cases because of the chest involvement. Was Rollier wrong in thinking that heliotherapy might be valuable in lung tuberculosis? These results pointed to that conclusion. He admitted that he had had no experience in pure pulmonary tuberculosis, and his conclusion that because it was valuable in surgical, it should be in pulmonary, was not founded on experience. While some pure pulmonary cases improved, some became worse, but all of the surgical cases with accompanying lung involvement improved. Now, how were these seemingly contradictory facts to be explained? It was not yet quite apparent, but there must be an explanation. To recapitulate briefly, here were the facts: (1) Practically all uncomplicated surgical cases of tuberculosis under heliotherapy got better. (2) All surgical cases with lung lesions got better, and **some** pure lung cases got **better**, but **some** pure lung cases got **worse**. Going back to Rollier for help, none was forthcoming. His experience at that time in pure pulmonary tuberculosis, as already stated, had been nil. All he had to offer was his expressed opinion that sun ought to be valuable, if a proper individual technic were employed. Finally, remembering that there were different types of lung tuberculosis, it gradually became apparent that here was, in all probability, the solution of the problem. That is to say, it was likely a matter of general type of lung tuberculosis that determined whether the patient improved, or did not improve under sun treatment, provided always, that the technic was correct.

The two broad divisions into which most cases of pulmonary tuberculosis can be divided are (1) exudative and (2) productive type. In order to refresh your memories concerning the points of differentiation of these two broad types, exudative and productive, it may be recalled that in the former (exudative), there is usually a history of more acute and severe onset, there are more toxic symptoms, higher and more continued fever, more rapid pulse, more loss of weight, more cough and ex-

pectoration, often night sweats, as contrasted with the productive type in which the onset is less acute, slower and more gradual, the patient has few toxic symptoms, frequently feels good, has less fever and slower pulse, usually not much loss of weight, or if there is, it has occurred slowly, less cough and expectoration, no night sweats; in fact the whole picture is less severe and more chronic throughout.

Physical examination in the exudative type shows, very often, only a comparatively small area of involvement in spite of pronounced general symptoms, and there is a tendency to more rapid extension and breaking down. Examination in the productive type usually shows a comparatively larger area of involvement, with few general symptoms, less tendency to extension and breaking down, often a large part or whole of one or both lungs is involved with many moist rales, but little cough or expectoration and only slight or no general symptoms. In other words, in the exudative type there is often disproportion between the signs elicited by examination and the general symptoms, the latter being more severe than the physical signs would indicate. In the productive type, there is the same disproportion but it is turned around; there are more physical signs than the general symptoms would suggest. The exudative type pursues a more florid and more rapid and acute course throughout. The productive type pursues a less angry, more indolent, and chronic course throughout.

The x-ray shows, in the exudative type, mottling, either fine or coarse, without much peri-bronchial increase and with a tendency for this mottling to coalesce with later cavity formation. The productive type appears as peri-bronchial strands or trunk formation, usually diffuse, often with beads along them, and less tendency to cavitation.

Keeping in mind, then, the two broad divisions into which most cases of pulmonary tuberculosis could be divided, a careful review of the cases of surgical tuberculosis with lung lesions showed that, almost universally, they could be classed under the broad type of productive. Looking over the pure pulmonary cases who improved under sun showed that they too could be classed under this type (productive). Looking over the pure pulmonary who became worse it was almost always the other type (exudative). Here then, was the explanation for the whole difficulty, and the question which before had seemed so obscure, resolved itself into a very simple one; viz., classification of cases. The following scheme of dividing all cases of tuberculosis into four broad classes was then evolved solely for use when considering heliotherapy. It is simple, entirely practical, and experience has proved that it solves the problem of how to properly select cases for heliotherapy.

Class 1. Pure extra-pulmonary tuberculosis without a pulmonary lesion.

Class 2. Extra-pulmonary tuberculosis with a coincident pulmonary lesion.

Class 3. Pure pulmonary tuberculosis of the productive type; also hilus gland type.

Class 4. Pure pulmonary tuberculosis of the exudative type; also all acute forms.

NOTES

In Class 4 (exudative) never use heliotherapy. It never does good, but often great harm.

In Class 3 (productive) use it only in those cases who, in spite of the best hygienic-dietetic treatment, remain in a stationary condition or are slowly losing ground. Do not use it in the others of this class, for they will get well without it. Use it in all hilus-gland types.

In Class 2 (surgical with lung lesion) use it in all cases, but be very careful to avoid reactions and especially careful about exposing the chest.

In Class 1 (pure surgical) use it in all cases. The thorax may soon be exposed like the rest of the body.

Of course it is to Rollier that most credit must be given for the present day wide-spread use of heliotherapy. True, other men helped to blaze the way, but it was he who made a road of a mere path and brilliantly illuminated it. He is to be especially commended **first** for emphasizing the importance of the sun and air bath to the whole body as opposed to its local use; **second,** for re-emphasizing that so-called surgical tuberculosis is not a local disease, but a general disease with local manifestations; and **third,** for urging constantly that if heliotherapy is to be successful, it must be given with the most carefully developed individual technic.

And now a word about the very important subject of **technic:** To try to cover this subject in detail is not possible in a paper of this length. All that it is hoped to do is to call attention to some important points which, in the writer's opinion, seem to need clarification or emphasis.

There is, unfortunately, a great deal of misunderstanding about this subject of

technic in heliotherapy. Most physicians today know of Rollier's work and results with heliotherapy; in fact, mention heliotherapy to the average physician and he immediately thinks of Rollier and no one else. Most physicians too, have heard of his technic or method, and here it seems is where the confusion arises. A great many confuse his technic with his zoning scheme; they seem to think that this zoning scheme which begins with exposing the feet to the sun for five minutes one or more times daily the first day, ten minutes to the feet and five minutes up to the knees the second day; fifteen minutes to the feet, ten minutes up to the knees, and five minutes up to the hips the third day, and so on, comprises a technic. And they seem to think that when they have mastered this, they have mastered heliotherapy. This zoning scheme is often spoken of as though it were a definite settled thing, as if it had been promulgated as a precise procedure that could always be used in a certain way and the same on all patients, as one would for instance use the Ziehl-Neelson method for staining tubercle bacilli, but this is not true. Rollier never intended this zoning scheme of his to be considered a technic for giving sun. He well knew from his own experience that if sun were to be given to patients successfully, it must be given in a very gradual manner, and that by beginning with the extremities rather than the trunk of the body, or seat of disease, a decongestive effect was produced, and one was much less likely to get unexpected reactions and it was easier to feel one's way. The average patient too, in his experience, could stand five minutes beginning exposure and increase without bad effects. So he published this scheme to be used tentatively, but intending that it must be fitted to each individual according to his particular reaction to the sun. If there is any one thing which he has emphasized more than another, it is the necessity of finding out the dose of sun which each patient can stand. Another thing is the need of great caution when approaching the chest; and still we see many patients exposing their chests just like the rest of their body, and in the presence of even very active pulmonary tuberculosis. The same may be said of the abdomen in tuberculosis of the peritoneum. No good, of course, can come of this and harm frequently is done. It is unfortunate, but true, that there is no short cut to technic, no hard and fast rule which one may follow, but, as indicated before, it is made up of many factors, it must be developed or built up as one goes along, because it depends upon individual differences which cannot be known in advance. It must be made, therefore, as you give your patient sun and according to the way he reacts. One must never consider the zoning scheme in any other manner than a way to start a person off, which will have to be altered in many cases. One patient will never stand five minutes initial exposure, another may stand this amount of initial exposure, but will not stand that much increase day after day, others may easily take more, and how much to give safely may only be known by watching carefully your patient's response.

It was just said that there was no hard and fast rule as to technic but it may be emphasized here that heliotherapy administered correctly never produces any disagreeable sensations; a patient taking it may not feel better while he is having it, or immediately after, but he must not feel worse nor must he have any symptoms he did not have when he began it (except it be a feeling of well being or exhilaration). If he does have other sensations one is probably over exposing. There are many factors which must be considered in applying heliotherapy successfully to the individual patient which time will only permit to be mentioned. First and foremost are **meteorological conditions,** whether it is being given at the seashore or on the desert, on the plains or in the mountains; **the humidity of the atmosphere**, whether moist and foggy, or dry and arid, whether contaminated with smoke and dirt or not; whether the sky is cloudy or clear, whether it is windy or still; **the temperature of the air**; whether hot or cold, the time of day, the season of the year. Next comes **the condition of the patient**; the sicker he is, the less heliotherapy will he stand; is his disease complicated or uncomplicated; the type of patient, brunette or blonde, and if the latter, whether ordinary or titian haired blonde. All of these things will make a difference in how the patient takes heliotherapy. In addition to the above there are certain general rules which must be applied to all patients alike. These rules are simple and ought to be well known, but they are neglected so often that they will bear repetition.

1. Always protect the head, either by a big broad brimmed hat or by having it in the shade.

2. Always wear dark glasses to protect the eyes.

3. Always cover up the site of disease until such time as lack of reaction and be-

ginning pigmentation shows that everything is going all right.

4. Always begin with the feet and progress slowly toward the trunk.

5. Always see that provision is made to protect the body from any cold wind. The patient must always feel comfortably warm.

6. In all cases with pulmonary involvement keep the chest covered up until sure that the patient is improving; then, and then only, one may begin to expose the chest, at first for not more than one minute a day, with a like amount of daily increase if all goes well.

7. In cases of peritoneal involvement, keep both the abdomen and chest covered until definite improvement is started; then expose first the abdomen very carefully, beginning with one minute a day and increasing each day by not more than that; later the chest may be added in the same manner.

In cases of involvement of the external lymph glands, much time will be saved by starting the patient on x-ray treatments and then continuing with heliotherapy.

Heliotherapy is really a misnomer; the term should be helio-aerotherapy (sun-air treatment), and the writer is inclined to believe that the air bath is of decidedly more importance than the sun part. Nobody has ever proved that the good effects we get from heliotherapy (meaning the general sun and air bath) could not be gotten from the air bath alone without the direct rays of the sun. It may be wholly the air bath which is responsible for the good effects, and we know certainly that when bad effects are gotten with this treatment they are due directly or indirectly to the sun. Patients do not get any bad effects from the air bath alone without the sun, or at least it has never been seen in my experience. For some time now I have urged many of my patients with pulmonary tuberculosis who are not taking heliotherapy (as well as those who are), to take air baths as many hours out of the twenty-four as possible. No harm has ever been seen to come from it, unless a patient was careless enough to let his body get cold. Unfortunately with our ingrained ideas of modesty and dress, it is hard to get them to do it, but each year a greater number are taking it, and it is hoped some day to have them all at it. It must not be concluded yet that it is as beneficial as the combination with sun; more time is needed to try it out, but I am convinced that it is very beneficial in many cases and with the exception noted above (cold), it never does harm and has the advantage that it can be used in all pulmonary cases without regard to type.

SUMMARY

1. Heliotherapy is not by any means universally indicated in all cases of tuberculosis. There are many patients in whom it ought not to be used at all.

2. Heliotherapy is not a cure for any type of tuberculosis, but is, in many cases, a very necessary and valuable adjunct therapeutic measure, especially in the so-called surgical tuberculosis.

3. Heliotherapy, for the very reason that it is not a cure, must never be used to the exclusion of our other valuable measures, as rest, etc.

4. Heliotherapy, it must be constantly remembered, can do great harm carelessly administered; for sunlight is a very powerful agent.

5. Heliotherapy, in the same dosage, affects different patients differently, more than almost any remedy with which I am familiar, especially in the beginning of its use.

6. Heliotherapy must, therefore, in every case be used not according to any set rule, but according to the reaction of each individual to it.

7. Heliotherapy is of the greatest value, and may be applied with the least chance of doing harm, in pure extra-pulmonary tuberculosis, i. e.; the so-called surgical tuberculosis without a pulmonary lesion.

8. Heliotherapy is of great value in extra-pulmonary tuberculosis carrying a coincident pulmonary lesion, but in giving it one must be very much more careful than in the uncomplicated form, especially about exposing the thorax.

9. Heliotherapy is of great value in the hilus gland type of tuberculosis and should be used in all such cases. Heliotherapy is of some value in some cases of the productive type of pure pulmonary tuberculosis, but it must be used with the greatest caution; otherwise it may transform a favorable, stationary or healing lesion into a rapidly progressing, fatal one.

10. Heliotherapy is practically never of value, and is often positively harmful, in the exudative type of pure pulmonary tuberculosis as well as all acute forms, and ought, therefore, never be used in these types.

11. Heliotherapy used in any type of tuberculosis must always allow the patient to feel the same, or better both during and after his sun bath; if it does not, something is wrong. Beware!

12. Aero-therapy (meaning the general air bath without any direct rays of the sun), time may prove to have most or all of the advantages of heliotherapy in pulmonary tuberculosis with none of its disadvantages.

ARITIFICIAL PNEUMOTHORAX IN THE TREATMENT OF PULMONARY TUBERCULOSIS

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Eleven years ago one of us coined the following paraphrase: "In the treatment of tuberculosis there now abideth fresh air, good food, rest, these three; but the greatest of these is rest." Rest was defined as meaning rest in bed and was pronounced essential to all cases of active pulmonary tuberculosis.

Recognized leaders in the medical profession at that time openly scoffed at the belief that bed-rest was necessary in the treatment of phthisis. This idea was very slow in taking root in the minds of the profession, and it was not until the careful painstaking work of Bushnell was forced into the lime-light by the great war that the rank and file of the profession began to grasp its real significance. Today, practically all are agreed on the supreme importance of bed-rest, and quite recently one of the most widely recognized authorities on this continent referred to rest as a specific in the treatment of pulmonary tuberculosis.

The real advances in the treatment of pulmonary tuberculosis in the past decade have been in emphasizing and clinching the idea, and in perfecting the details, of general and localized rest. Typhoid or bed-pan rest now occupies a foremost place in the treatment of acute and stubbornly chronic cases. A number of appliances, devices and operations are now being used for the purpose of limiting the motion of the affected side and giving complete or partial rest to the diseased lung; of these, artificial pneumothorax is the most widely used, and, in a strictly limited field, gives the most striking results. These advances in technic have served to confirm the idea that rest in bed is essential in all cases of active pulmonary tuberculosis, and that artificial pneumothorax and all other measures for giving localized rest to the diseased lung are only aids or extensions to be used in conjunction with or following rest in bed of the whole body.

AIM AND EFFECTS

The aim of artificial pneumothorax is to introduce into the pleural cavity filtered air or gas, which will collapse the affected or more affected lung, which is thus put at rest and given an opportunity to heal. As rest is the greatest factor in the treatment of any form of tuberculosis, it can be easily appreciated just what pneumothorax does, if we will but stop and realize that the lung expands and contracts about 25,000 times a day. Moreover, the lungs are in a constant state of distention even after the most forcible expiration, and any solution of the continuity of this tissue remains separated. However, with the lung collapsed and immobilized, the diseased parts and walls of cavities are brought into apposition so that they may cicatrize by the formation of connective tissue. But pneumothorax does even more than this. By compression, the pus and cheesy detritus in cavities and the inflammatory exudates in the alveoli and bronchioles are squeezed out, removing the main source of toxic absorption. As a result of this drainage, mixed infection is eliminated and prevented. Superinfection of other parts of the organs is, in a measure, prevented. There is also induced a passive hyperemia in the collapsed lung, which is known as an important factor in the defense of the tissues against the tubercle bacilli. The lymph channels of the lung are also collapsed, and as a result, the absorption of toxins into the general circulation is impeded or arrested; and the fever, night sweats, weakness, etc., are overcome, and the body given a chance to recuperate.

CHOICE OF CASES

Pneumothorax is indicated in:—

1. Acute caseous unilateral lesions.

2. Progressive fibro-caseous unilateral lesions.

3. Active progressive lesions in one lung, with an arrested or inactive lesion in the upper lobe of the good lung.

4. Advanced cases with bilateral disease, in which one lung is extensively in-

volved with perhaps cavitation, while the other side shows only limited involvement.

5. Hemorrhage: (a) Massive hemorrhage, where it is known from which lung it arises. (b) Cases with small or moderate hemorrhages recurring in spite of all less radical measures.

In the first class, we think that artificial pneumothorax should be induced without much delay, as it is our experience that this particular type rarely responds to the usual method of treatment.

In the second and third classes, bed-rest, and, when necessary, postural rest, should be given a fair trial for a reasonable length of time before artificial pneumothorax is considered. On the other hand it must not be forgotten that the longer the disease continues the more likely are pleural adhesions to form, and the less likelihood is there of being able to get a satisfactory compression of the lung. For this reason, constant careful study of each case should be made. In addition to a careful study of the history and progress of the case, we should not arrive at any definite conclusion until we have exhausted every available means of examination, such as repeated physical examinations, including fluoroscopic and radiographic methods.

In the fourth class, it is better to have nothing more than an infiltration on the good side and that not extending much below the apex. In these cases it is to be remembered that one generally obtains only prolonged relief of symptoms, rarely cures. With superficial cavities where there is great danger of rupture of the lung under compression, or in the presence of adhesions, there will be a failure to bring about a satisfactory collapse.

In massive hemorrhage, the only question to be determined is which lung is bleeding. The opinion of the patient is often very valuable in these cases. In repeated small or moderate hemorrhages one must decide if the bleeding can be properly controlled by other and simpler means, and whether the other lung can probably do the additional work.

CONTRAINDICATIONS

1. A fairly extensive active process in the good lung, especially if the middle or lower part of the lung is involved.

2. Presence of definite disease of the heart, blood-vessels, or kidneys.

3. Presence of serious tuberculous complications; (a) extensive ulcerative enteritis, (b) active ulcerative laryngitis, if too extensive, (c) extensive disease of the genito-urinary tract.

4. Mechanical interference, such as marked adhesions.

5. Fibroid cases with extensive emphysema.

6. Ignorant or irresponsible individuals who cannot be depended upon to follow the treatment through.

Of course every one understands that there are numerous cases of pulmonary tuberculosis which do well without any special treatment, and it is therefore very inadvisable to subject them to this operation with its potential complications. This is especially true of incipient and abortive cases.

TECHNIC

The operation should be performed with all the attention to technic and asepsis that the operator would accord to a major surgical operation. The object is to introduce filtered air or gas into the pleural cavity. After carefully anesthetizing the area with one per cent procaine, a simple puncture of the chest wall is made with a hollow needle connected with a gas reservoir and a water manometer through a tube. When the lumen of the needle punctures the costal pleura and there is a respiratory oscillation in the manometer, the gas is allowed to flow into the pleural cavity by the negative pressure in that cavity, as well as by some positive pressure, which must at times be used at the gas reservoir. There are certain difficulties to overcome and dangers to be avoided, but the time is not sufficient to permit going into all the technic at this time. While the ideal site for puncture is either in the anterior or posterior axillary line, because of pleuritic adhesions, we are many times compelled to select other places. At times it is difficult to determine just where the site should be. However, if an area of normal lung tissue can be found as shown by percussion or auscultation, this is the site we should try. Another aid is to puncture over an area where there is a to and fro friction rub which should indicate a free pleura.

The gas used varies with the operator and while nitrogen was formerly thought to be the most suitable, later experience has taught us that filtered air is just as good. The amount of air to be introduced should be small, at first from 100 to 300 cc. Later larger amounts may be used, but it is rarely necessary to use more than 400 cc. However, this varies with the individual case. At first it is introduced every other day, gradually increasing the interval from ten days to two weeks or more. Frequent study by fluoroscope and occasionally by stereoscopic x-ray films should be made to

control frequency of refills, it being the intention to keep the lung or diseased portion of the lung as nearly motionless as possible.

COMPLICATIONS

The complications are: 1. Pleural shock. 2. Gas embolism. 3. Pain. 4. Spontaneous pneumothorax. 5. Emphysema. 6. Pleural effusion. 7. Pyothorax. 8. Extension of disease to other lung. Of these the most frequent is pleural effusion, which is sometimes followed by pyothorax. These are the only two complications which we will discuss.

Pleural Effusion. It is generally agreed that at least fifty percent of all cases develop fluid, but a review of the literature indicates that men with the most experience report the highest incidence of fluid, some as high as ninety percent. The chances of effusion increase with the length of treatment, and with the extent and intensity of the involvement. The most logical explanation of the cause of fluid is that of an endogenous reinfestion of, or migration of bacilli to, the pleura. Other reasons advanced are (1) cold; (2) physical over-exertion; (3) irritant quality of gas used or its being too cold; (4) puncture of lung by needle; (5) tearing of adhesions; (6) varying degree of intrapleural pressure.

Practically all are agreed that small serous effusions do best if left to Nature. In larger effusions, especially if they show any tendency to become thick or purulent, even if they remain sterile, some advocate aspiration and replacement with air. Others advocate, in addition to aspiration and air replacement, that the pleural cavity be treated with various antiseptic solutions, such as aniline dyes, formaldehyde in glycerine, etc. We have had no personal experience with formaldehyde in glycerine, but we are inclined to be prejudiced against it on account of the irritant quality of this drug and the marked reactions which immediately follow its use. Our limited experience with aniline dyes did not meet with enough success to warrant us in continuing its use.

The question of the treatment of fluid, therefore, is one that is not definitely settled. It has been our experience, however, that a sterile fluid, while inconvenient, does not interfere with the progress of the case to any extent. Therefore, it has been our custom to leave sterile fluids alone unless they cause respiratory embarrassment, and then we aspirate.

Pyothorax:—Pyothorax practically always follows spontaneous pneumothorax and when sterile effusions in artificial pneumothorax become infected the mortality is very high. The treatment is very unsatisfactory but we may try one of the aniline dyes. Operative procedure, such as open drainage or thoracoplasty, may be used as a last resort, but the results of this form of treatment are far from encouraging.

LENGTH OF TREATMENT

It is becoming more and more apparent to us that in cases with extensive involvement, with cavitation, the compression should be continued through life. After the condition of a patient has sufficiently improved, he should be given the choice of continuing pneumothorax indefinitely or of having a thoracoplasty performed. We believe that as the technic of thoracoplasty is improved and the death rate continues to diminish, more and more of these cases will decide to have this operation performed. In cases with small or moderate involvement on one side, we should attempt to discontinue pneumothorax in from one to two years after the patient is free from symptoms.

RESULTS

In a general way statistics indicate that complete success can be obtained in 25% of compressed cases, while a definite improvement is gotten in another 25% or 30%. In 45% or 50% of cases no permanent improvement results.

The final results are often determined by the effects of the compression on the opposite lung. If a satisfactory compression is obtained and the other lung can do the extra work and still improve, the results which follow are usually excellent. If the condition of the opposite lung remains stationary under its additional load, the results are often satisfactory. If the disease in the other lung extends, the compressions should be discontinued and the outlook for the case is bad.

CONCLUSIONS

1. Artificial pneumothorax is not a cure for pulmonary tuberculosis. It is, however, a very important advance in the treatment of certain selected cases but only when used in conjunction with the recognized routine measures.

2. The indications and contra-indications for using artificial pneumothorax in pulmonary tuberculosis have been quite definitely established.

3. The dosage, frequency of refills and degree of compression vary with the individual case. The general principle to be followed, however, and one of the greatest importance, is that after determining the

degree of compression which is most desirable, the lung should be kept motionless at that point. This can be done by proper spacing and dosage of refills.

4. Serious complications are so rare that fear of them should never deter one from attempting the procedure when indicated.

5. The indications for discontinuance vary with the type of case. In some the compression should be maintained for life unless a thoracoplasty is substituted. On others it may be discontinued in from one to three years.

6. It increases by approximately 50% the chances of controlling the disease in certain chronic cases which otherwise almost invariably do badly.

DISCUSSION

(Discussion of the three papers in this symposium was opened by Dr. Fred G. Holmes, of Phoenix, Arizona.)

DR. HOLMES:—I am only going to take a very few minutes in discussing these papers.

First, with regard to Dr. Watson's paper. I think it is about the finest paper I have ever heard read on heliotherapy, the most convincing, and, so far as I am concerned, the most educational. His review of the classification of tuberculosis in the pulmonary type of the disease is fine, and it brings home to me as never before the reasons why we have not gotten as good results as we should. If we follow his classification as given, I believe we will get better results in our heliotherapy. I wish to emphasize the fact that it is probably the air which is doing the work. For a long time now I have been having my patients take air baths on the porches, and they get almost as good a coat of tan as if exposed to the direct rays of the sunlight, and apparently no ill results.

In the first paper by Dr. Egbert, he stated a point on which I disagree. that is, that the lung would not come back if it had been collapsed for some time. Dogs have been kept under collapse for years, and their lungs have returned to normal with very little difficulty. With all pulmonary tuberculosis we have found that unless there is a thickened pleura it will return, and will function very well. That is, of course, the good part of the lung; the other we are very willing to let go.

Obliteration of the pleura can not be told except by trying. It can not be told by the x-ray; I have been trying for two years to do that, and have failed, because from an x-ray standpoint it may seem to be entirely obliterated and still be perfectly free.

I heartily agree with Dr. Egbert in the stand he takes in regard to pneumothorax. I think we can get a higher percentage than the fifty percent he gives, if conditions are right.

With regard to Dr. Flynn's paper on ordinary pneumothorax, I feel that the collapse will shorten the patient's time in bed. I do not think there is any necessity of keeping them in bed longer than two months, unless, of course, they are very sick. If you put a splint on a fractured arm, you would not keep the patient in bed because of it for any length of time. If the other lung is normal he can be allowed up and about in a very short time; they are no longer, at least, considered as wholly bed patients. Their symptoms should govern the extent to which they are allowed up.

Regarding fluids, I do not know what the causes are. I think a sterile fluid is a benefit. If I knew in advance of a collapse that a patient was going to have fluid, I would go ahead with it just the same. However, in such a case we must be more careful to see that we do not get an adhesion of the lung underneath the fluid. We must see that it is not coming out under the fluid. I think it was that which killed Dr. Trudeau; if it hadn't been for that he would not have died as soon as he did.

With regard to Dr. Allen's remarks on partial collapse, I feel that they are hardly justified for a man in private practice. I have had good success with a total collapse, when I have been able to get them. For a patient in private practice to return to the office for collapse so often entails an unjustified expense.

DR. W. W. WATKINS, Phoenix, Arizona:—These papers we have heard read illustrate something a man from El Paso mentioned over at the New Mexico meeting, as published recently in our Journal; that is, that a tuberculosis specialist is nothing but a specialist in internal medicine; he is an internist who devotes most of his time to chest diseases, and the tuberculosis specialist, pure and simple, is an anomaly.

As to pneumothorax, I have always taken a great interest in pneumothorax; I believe that I gave the first pneumothorax administration in the state of Arizona, in 1912—twelve years ago. One of my first cases is still working in Phoenix and recently took out $20,000 in life insurance. Two of the other cases I had in that year are well and doing full time work.

Regarding Dr. Watson's paper on heliotherapy. I think the points he makes are well worth study, and it behooves us to remember, when we are dealing with sunlight, that we are dealing with a very potent remedy. You can not tell your patient to go out and take a sun bath any more than you can tell him to go out and take a dose of strychnine; it should be prescribed as carefully as aything else. I would say it is more potent than x-radiation even, considering the amount you take. You know you would not expose your patient to x-radiation with impunity. We can do an immense amount of harm as well as an immense amount of good with heliotherapy, and it must be constantly supervised down to the finest detail, with a careful study of the patient. However, that is not the common practice, for I do know that doctors usually tell their patients to "go out and take sun baths."

As far as the technic of Rollier is concerned, that is not applicable in all cases. I would add,—from the little experience I have had in doing tuberculosis work,—that while heliotherapy is a valuable thing, it must be carefully used and can not be given on a general plan or scheme of technic.

DR. E. W. PHILLIPS (Phoenix, Arizona):—I want to say that I think Dr. Watson's paper is admirably written and is not too emphatic. Sunlight can do as much harm as strychnine, but it could do a great deal of good in tuberculosis if the patient will follow along the lines Dr. Watson has laid down.

One thing about air baths,—an air bath is almost always an indirect sun bath, in reality; it would be difficult to separate the two things unless we give the air bath in a dark place, which is really never done; so an air bath is an indirect sun bath.

DR. WILLARD SMITH (Phoenix, Arizona):—There are two points I would like to speak of.

First on this subject of expansion; I have watched this for a number of years, beginning about ten years ago, and have had a number of cases where they have had complete alveolar expansion.

Second about fluid;—fluid particularly occurs in cases of adhesive bands. We all know that it is possible to tear a lung with gas, and great care must be taken in compression. If you get an abscess in the pleura, you are not dealing with pneumothorax and a fluid, but an empyema. That brings in another bunch of things that it would be well for the tyro to remember.

DR. J. I. BUTLER, Tucson, Arizona:—I hear constantly the mention of Rollier, and his methods and treatment. I have yet to hear a word spoken of Lagrasso, of New York. And yet he has five hundred men under heliotherapy, and is doing a most remarkable work.

Lagrasso is a most cordial man to meet, and welcomes everyone who goes there, just as Rollier, and he can show you things that really open your eyes. After my visit there in New York I went to Chicago and spent a little time with Dr. Becker, who knew nothing about Lagrasso at all.

If you notify Lagrasso that you are coming he will have you met at the train, and will be glad to show you all over his sanitarium. These cases of his, the methods he uses, the checks he regards as necessary, the investigation that is taking place with regard to heliotherapy,—all are signs of the work that is going on in this country. And it is an entertainment to see his patients, —a whole army of little shavers in breech clouts and wide hats, and on roller skates, if you please. It is a sight well worth seeing. The Buffalo Hospital and the laboratory work are alone worth a visit. And all of these cases they have given work on by sun rays. They have been investigating the development of ordinary sun rays, measuring, meteorological observations, etc. It is a revelation in scientific work.

DR. J. W. LAWS, El Paso, Texas:—I agree with some of the others here who have discussed the return of the function of the lung after compression that has been allowed to come back. From my observations, the true proportions of the lung are again resumed, that is the good portions of the lung.

One point I want to express regarding thoracoplasty. I have had only a limited number of cases but I feel that we are neglecting many of our cases with whom we have tried pneumothorax, and have failed to let the condition progress satisfactorily where thoracoplasty should have been advised and the patient operated on.

Dr. Watson's paper is fine on the subject of heliotherapy, and I feel, as he does, that the air bath is one of the big things, one of the big elements in the treatment of the patient, where heliotherapy is properly given.

Dr. Flynn's article covers his subject so thoroughly that there is little to add. The continuation of pneumothorax for life is a little startling, and I am inclined to think that this would be limited to only a few cases. Pneumothorax is used in many cases as a means to prolong the patient's life only, without expectation of recovery, and in my opinion is often times indicated where the better lung is active. I have seen progressive cases with the trouble practically all over one lung where pneumothorax was used, not with the idea of curing them, but with the idea of prolonging life and making them more comfortable during the time they had left to live.

DR. O. EBERT, (El Paso, Texas,) closing:—I want to join in the reception that has been given Dr. Watson's paper. May I just say that, outside of practically every point being pertinent, I believe the air bath for building up the resistance of the individual by exposure to air and sun, or both, is of the greatest service. Personally I have been most particularly interested in developing resistance to the on-coming winter by advising this treatment, because I feel that if it does not build up resistance and limit the possibility of acute respiratory difficulty,—which is our greatest enemy from any standpoint in tuberculosis,—it would be a very strange thing.

I also was much interested in the particular statements in that paper regarding the return of the alveolar function of the lung. In the face of such splendid criticisms I feel that my position is rather doubtful, because there are a great many men here older than I and who have had more experience, and I can not meet their arguments with individual experience. My ideas are those gathered from literature and study of the pathology of the lung, in which the alveolus is proved to have lost its elasticity to a great extent; I believe in my paper I did not say positively, but that it was doubtful if the alveoli would return to its normal size; that in most cases it did return, of course, but only to a very limited degree. But certainly the pathologists who have worked on this make a very strong point in saying that in many instances the reticulum about the alveoli is so fibrous that the elasticity is largely lost.

DR. S. H. WATSON, Tucson, Arizona (closing):—I do not want to say anything about my own paper except to thank the gentlemen for their very generous discussion of it. And I want to compliment Drs. Egbert, Flynn, Allen and McWhirt. I listened with a great deal of interest to the papers of Dr. Flynn and Dr. Allen, and enjoyed particularly the demonstration of that one case in which they had produced ordinary pneumothorax, and I thought as I was sitting there that it was most fitting that Dr. Flynn should be the man to link up this local rest produced by the pneumothorax with the general bed rest required in tuberculosis, for whether you may know it or not, Dr. Flynn was a pioneer in seeing the importance of bed rest for all patients with that disease; he was a pioneer, too, in employing and applying it. At the time he became convinced of the importance of bed rest in tuberculosis, the so-called authorities were using rest in only a haphazard sort of way, and they did not consider it very important unless the patient had fever.

I shall never forget the paper that Dr. Flynn read at the Minneapolis meeting of the American Medical Association about his ideas on rest. That it was revolutionary in its recommendations may be gathered by the fact that every man before whom he discussed it was a recognized authority and they jumped all over him. He talked right from the shoulder and they didn't like what he said. That he was entirely right, time has proved.

I have always felt that I have had many patients with tuberculosis who did not get well, and who would have gotten well if they had added to the local rest they were getting, from pneumothorax, more general rest for a longer period after the pneumothorax was instituted. It is the old story of surgical tuberculosis; it is not cured by local rest alone; general rest and other general measures are indicated to build up bodily resistance and immunity,—and it is the same with pneumothorax in the lung,—it is local, and local treatment is not enough ,if we are going to get the greater number of our patients well, because tuberculosis is not a local disease; it is a general disease with local manifestations, and for that you need general measures, the most important of which is general rest.

DR. JAMES H. ALLEN, Whipple Barracks, Arizona, (closing):—Before closing this discussion

I would like to express my appreciation of the paper that Dr. Egbert just read. I think it is particularly appropriate that he brought this paper to our attention at this time, because it is only lately that thoracoplasty has had such an important place in the treatment of tuberculosis.

I was also much impressed with Dr. Watson's paper, because about two years ago I had an opportunity at Fitzimmons General Hospital in Denver to see some work that Major Bruns was doing with heliotherapy, and I began to understand its value in tuberculosis.

I also appreciate the comments on pneumothorax. and I am inclined to agree somewhat with Dr. Holmes about complete collapse in certain cases. When I drew the conclusion that a partial collapse was better than a complete collapse, I did not take into consideration the fact that physicians in private life do not, as a rule, have the facilities to check up their compressions under fluoroscope and x-ray examinations, and I believe that in cases where you can not check them up carefully, it would probably be advisable to induce a complete collapse and keep it at that point all the time. However, I still believe that where we have the facilities a partial collapse is best. It does not result in so much mediastinal involvement, and when we get ready to let the lung expend it is not so likely to cause a recurrence of the disease.

So far as letting the patient up is concerned, I believe if we follow the indications as we do in ordinary tuberculosis, for pneumothorax, we will be on the safe side. In other words, when the temperature subsides, and the patient has gained in weight, it is all right to let him up.

About this point of continuing the pneumothorax indefinitely:—I realize that there are only a few cases where it should be continued indefinitely, but there are a certain few cases in which there is multiple cavitation, or very large cavities that are almost moribund when we start this procedure, and who under the procedure obtain a complete relief,—we believe in those cases it is better to continue the pneumothorax indefinitely.

DR. JOHN W. FLYNN, Prescott, Arizona (closing),—I would like to say one word. Dr. Watkins is right when he says that he is the dean of the profession so far as pneumothorax is concerned in this state. The first compression I had done, Dr. Watkins came up to Prescott and did it for me, and it was the first time I had ever seen it done. That was in 1912 or 1913.

TUBERCULOSIS OF THE EYE AND ITS RELATION TO GENERAL MEDICINE

By H. H. Stark, M. D., F. A. C. S.
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In the past ten years there has been a greater development from the study of tuberculosis of the eye than in the previous century. The study has not only added to our knowledge of the disease in this organ, but, owing to the fact that pathological changes take place under direct observation, has added greatly to our knowledge of the disease in other parts of the body.

In beginning the study of tuberculosis of the eye, we accept as a fact the statement of experts on tuberculosis, that over 95% of the civilized race have systemic infection early in life. From our standpoint, we do not enter into a discussion of whether this infection takes place through the respiratory, or the gastro-intestinal tract, but leave that to the internist and the pathologist to decide.

The process, after the infection, depends on the ability of the individual to overcome the disease. This is done through the development of tissue resistance to the toxin and the production of localized exudate around the lesions, which subsequently organize and shrink, thus limiting the activity of the bacilli, which eventually become attenuated. Therefore we may have some lesions existing in the body from childhood to old age, varying from those having marked activity to those containing dead bacilli.

The truth of this condition is well known to all of us through the different tests with tuberculin. In the test, depending no doubt on the number of antibodies in the patient's blood, the reaction is usually in harmony with the amount of activity existing in the patient's body. Certain qualifications of this statement are necessary when applied to people with severe infection, for in some of these cases the tests may be negative owing to the large amount of toxin, which evidently prevents the formation of antibodies.

The lesions of the eye recognized as tuberculous vary from those produced by toxemia, manifesting themselves as asthenopia, to the gross changes characterized as corneal ulcer, iritis, with tubercles in the iris, cyclitis, retinitis, choroiditis, phlebitis, endarteritis and retinal hemorrhage. All these changes are influenced by the amount of activity, the intra-ocular conditions being more frequently found in those individuals having no activity in the lungs. The conditions may be roughly divided into three stages of life. However, no sharp line of demarcation may be drawn, as frequently one overlaps the other. The first

stage is from infancy to puberty; the second from puberty to adult life, and the third, adult life.

First period: The most pronounced cases in childhood are those of eczematous kerato-conjunctivitis, with corneolimbal ulcers, photophobia, eczema, nasal discharge and enlarged glands, due no doubt to tuberculo-toxemia secondary to glandular involvement, for they seldom have activity in the lungs.

I am aware that tuberculosis is not universally accepted as the cause of this condition, but the preponderance of clinical and therapeutic evidence seems to favor this theory. However, there may be contributing factors, such as digestive disturbance, improper diet, or the absorption of toxic products from infected tonsils, nasal sinuses, or intestinal tract. The toxemia seems to interfere with the natural process of healing, either by flooding the system with toxic materials or by its interference with the action of the antibodies and antigen, possibly through the absorption of the complement. When the secondary toxic material is eliminated, the rapidity of cure is sometimes startling.

Another contributing factor, in my opinion, is the high degree of hypermetropia, which refractive error is sufficient to produce ocular symptoms in children who otherwise might escape.

I have had under observation during the past few years, twenty patients with severe eczematous keratitis, on whom I have tested the efficiency of tuberculin. Previous to treatment, some of the patients had repeated attacks. The diet and hygienic surroundings of all were bad. Without correcting the diet, intestinal toxemia, or using surgical interference on the tonsils or nasal sinuses, treatment was commenced with small subcutaneous doses of old tuberculin. Under this treatment a number showed focal reactions in the eye with doses of tuberculin as low as 1/50,000 of a milligram, and under continued treatment for a few months, the eyes became clear and in all except one case have remained apparently well. In the one case, the acute symptoms subsided to recur three years later following an attack of tonsillitis. After tonsillectomy, an improvement in the eye condition could be noted within 24 hours and continued uninterruptedly.

A low grade of toxemia may be found in the children who have no gross lesion of the eye, but who have headaches and photophobia of more or less marked degree, usually in the afternoon. They are substandard in weight, highly nervous, and frequently with irritable temper. The correction of any refractive error does not relieve the condition, as the same symptoms may occur with an ametropic eye. The fundus discloses a congested retina, with silvery reflexes playing over it along the vessels, and the disk is frequently congested along the edge. The patient has an irregular temperature, many times found only on repeated examinations. Temperature and pulse rate may increase with exercise. The dermal test is usually positive. Some cases improve following tonsillectomy, change of diet and elimination of intestinal absorption, while in others, the condition remains for years, even during the second and third periods of life.

There may occur retinal and choroidal changes in childhood, due to metastasis from the diseased areas. When this does occur, there is evidently spontaneous healing, leaving a patch of retinal pigment, with atrophy of the choroid through which can be seen the white sclera. These spots are only occasionally found, indicating that it seldom occurs.

Second period: There is no fixed age at which this period begins, as it depends altogether on when the infection occurs and on the general health of the individual. Should the patient be constantly exposed to infection, the activity is usually longer and may result fatally. When the living standard is high and no disease exists with which one may come in contact, the period is shorter. The cases in which the infection results in relative immunity and the life of the individual is carried on without too much physical or mental strain, may remain inactive. However, there may be redevelopment of the original lesion, or distribution of the infection by metastasis at any time should the resistance be lowered.

There is no sharp line of demarcation drawn between the disease of childhood and that of adult life, but we may safely say that the period between late youth and the first few years of adult life is an extremely dangerous one. It is at this time, if the individual has not developed tissue resistance that the redevelopment of the disease, or reinfection is most disastrous.

It has been my experience to find frequently in early adult life, cases of monocular mydriasis, due no doubt to the involvement of the sympathetic nervous system. One of my cases at the age of 24 had the pupil of one eye dilated with no reaction to light or accommodation, which was the only symptom of tuberculosis, from which disease she died five years later.

There are often found during this period the same symptoms as in the second stage of the disease in childhood, which, in the adult are usually ascribed to eye strain. It is not infrequent to find a patient with active pulmonary tuberculosis, who gives a history of having headache, photophobia and all the symptoms of eye strain, months and sometimes years before the activity in the lungs was discovered. These symptoms are so common in tuberculosis of the lungs that when they occur chest examination is always indicated, and even where no activity is found, they should be continued under observation.

Also, in the second period of life, occur the involvement of the deeper tissues of the eye, especially scleritis, sclerosing keratitis and retinal hemorrhage.

Third period: In adult life, the cases with marked active tuberculous involvement have symptoms similar to those found in the second stage of childhood. The headache may be so severe as to lead one to suspect meningitis and is usually not relieved by putting the eye to rest with atropin, or correcting any refractive error. However, the latter should always be done. There should be a limit to the amount of close work and the eye should be protected from the light, but no great relief may be expected unless the physical condition improves.

In the active stage of tuberculosis, there is seldom an involvement of the deeper tissues of the eye, being due no doubt to the fact that any infection passing into the blood stream is destroyed by the protecting antibodies developed to resist the systemic infection.

The second group of cases in the adult is made up of those who have overcome their primary infection to such an extent that they are usually classified as healthy individuals. There may remain, however, a few latent foci, either in the lungs or glands, which are so insignificant that they are not producing enough toxin to stimulate the development of antibodies. These bacilli become attenuated and less virulent than those producing the initial lesion, so that when an infection from one of these foci enters the blood stream, there is little resistance given to its invasion of other parts of the body. It is consequently patients of this character who have involvement of the uveal tract, showing as localized choroiditis, tubercles of the iris and other intraocular involvement. Contributing factors, the same as those found in childhood, must always be considered and especial consideration should be given the nasal sinuses, the teeth, tonsils and gallbladder.

A grade lower than these cases are those which have symptoms resembling those in the second stage of childhood. In addition they are highly nervous, have migraine and present the picture familiar as hysteria, or neurasthenia. They are frequently underweight and have been most of their lives.

In some of these cases we find a silvery reflex over the retinal vessels and a slight exudate over the disk. Old corneal nebulae may occasionally be found, indicating keratoconjunctivitis in childhood. Correcting the refractive error may improve the condition to a slight degree, but many cases are examined year after year, going from one ophthalmologist to another, without relief.

It is not infrequent that from these symptoms I have been led to suspect pulmonary tuberculosis, which was confirmed by physical examination. However, the majority of the cases have no physical signs by which we can make a diagnosis and are finally classified only by testing with tuberculin. I have recently had a case of a woman, sixty years of age, who has been under observation for fifteen years, well nourished, with absolutely no symptoms familiar to us as tuberculosis. She has never been comfortable with glasses, has had persistent photophobia and been unable to use her eyes for close work for any length of time. It was only when there began the development of central macular change of the retina that I finally suspected latent tuberculosis, which was proved to my satisfaction by testing with tuberculin. After the initial diagnostic dose, she showed a reaction to 1/100,000 of a milligram.

DIAGNOSIS

General Examination: We are assisted in making a diagnosis by a physical examination of the chest. However, the tendency of the average physician is to report negative cases having no physical findings similar to those of active tuberculosis. In other words, where no rales are found in the chest, nor any rise of temperature above normal occurs, the average physician considers there is no tuberculosis. Therefore, in making a diagnosis in occult cases, we are compelled to resort to other methods. The history of the individual's life in childhood should be obtained, as occasionally the information given throws a strong light on the present condition. Especially important is the history of slow recovery following measles or a long period of fever similar to typhoid. In all cases the tem-

perature should be taken at least four times a day for a number of days. In the adult, it is frequently found to be subnormal in the morning, occasionally as low as 95, sometimes not reaching normal during the entire twenty-four hours; at other times it is slightly above normal in the afternoon. A variation of two degrees in 24 hours is strongly suspicious of tuberculosis. However, the disease may be present without this variation of temperature. In adults there is usually a subnormal blood pressure.

Use of tuberculin: Dermal test: This test is only of occasional value in making a diagnosis of localized tuberculosis by producing a focal reaction. However, it is frequently of value in determining the sensitiveness of the individual to tuberculin, thus indicating the size of the initial subcutaneous dose, which should always be small in the case of a marked local reaction.

Subcutaneous test: In the use of a subcutaneous injection of tuberculin for diagnostic purposes, we expect in a positive case to have a rise of temperature within 48 hours, a local reaction at the site of the injection and a focal reaction indicated by increased activity and exudate around the lesion. The size of these doses varies with the age of the individual and the amount of systemic infection. It may be roughly stated that in a child without pulmonary activity, the initial dose may be 1/50,000 of a milligram, while an adult without activity may be given 1/10,000 milligram. These doses are not standard, but are considered safe and conservative. Where there is no reaction from the initial dose, the amount should be doubled each 48 hours until the three reactions occur, remembering that the danger of administering tuberculin subcutaneously is usually in the initial dose.

Therapeutic test: In some cases we feel so positive of our diagnosis that the preliminary tests are not given and the case is immediately put on therapeutic doses. Individuals vary in response to this treatment, some of them clearing entirely before a reaction occurs, while others require a dose producing a focal reaction before any improvement is noticed.

I have seen a case of sclerosing keratitis develop while the patient was under tuberculin treatment, which started to improve immediately after a dose causing a slight reaction. We should remember that there is no way in which tuberculin can be standardized and that the products of each laboratory may vary in strength, depending no doubt on the strains used in producing the product.

The question arises in the administration of tuberculin as to whether or not we are dealing with a specific proteid. Of this I am fully convinced, otherwise we would not have a general, local and focal reaction, with two minims of the solution, representing 1/100,000 of a milligram, in comparison with ten milligrams of milk or other proteid.

Contra-indications for the use of tuberculin in tuberculosis of the eye are the same as in tuberculosis of the lungs—activity of marked degree and a daily rise of temperature of over one degree.

CONCLUSIONS

In conclusion I wish to emphasize the facts:

That 95% of the civilized race have tuberculosis sometime during life, usually in childhood.

That practically all of them go through a period of infection untreated.

That there may remain latent foci even in apparently healthy individuals subject to relighting up of this area, or the distribution of the infection by metastasis to any part of the body.

That the metastatic infection in the eye is brought to the attention of the individual more often because the function of this organ is so delicate that any interference with its action is immediately noticed, while in other parts of the body it may go on unobserved.

That the changes in the eye are under direct observation and the effect of the diagnostic and therapeutic doses of tuberculin may be closely watched.

That pathological changes represented in the eye lesion no doubt occur in other organs or tissues of the body and pursue the same course.

NASAL TUBERCULOSIS*

By S. A. Schuster, M. D.
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**Read before the Tenth Annual Meeting of the Medical & Surgical Association of the Southwest, held at Phoenix, Arizona, November 6 to 8, 1924.*

I wish to present for your consideration and discussion a composite description of nasal tuberculosis. Much of the material herein presented has been obtained firstly, from a review of the literature beginning as far back as 1890, with monumental arti-

cles by such men as Hahn, Hajek, Chiari and Freer; secondly, from discussions with my confreres, and lastly, from the author's personal experience with this disease condition.

The entrance of tubercle bacilli in the nasal mucosa may be followed by the development of one of two groups of phenomena; the tuberculous and the lupic. Clinically the two processes are usually distinct, but their practical identity must nevertheless be admitted. They develop from the same bacillus, their symtomatology differs but little and that largely in virulence or intensity, and their histologic structure shows variations in grade of development only, not in type. Independent only in name and certain minor symptomatic and unknown etiologic considerations, a comprehensive discussion of either disease without embracing the other to a certain extent is impracticable. Because of this dual nature, the literature is both voluminous and to a certain extent misleading, many observers having maintained the absolute identity of the two processes, while others persist in classifying them as distinct pathologic entities.

For the sake of a clear understanding of the matter, therefore, I have sought out from the literature what is regarded as the distinguishing characteristics of the lupic type and the tuberculous type proper, and shall present them for comparison.

The lupic type occurs commonly at the age of puberty and usually in the female, while the tuberculous type proper occurs between the ages of 25 and 60, and is at least as frequent in the male as in the female. The lupic form is a primary form of nasal tuberculosis of exceedingly slow course, extending at times over decades. It may remain the only evidence of tuberculosis in the body, generally leading late, if at all, to secondary tuberculous deposits. The tuberculous type is more rapid and less benign and is often secondary to other tuberculous foci, especially pulmonary tuberculosis, and if primary, is disposed to an earlier creation of other tuberculous affections.

The lupic type appears in the form of granulations and diffuse infiltrations, which, instead of breaking down rapidly, have a tendency to cicatricial metamorphosis, so that the disease heals by scar formation in some places while progressing in others. The tuberculous tissue in lupus advances superficially in the mucosa and invades cartilage and bone, if at all, late in its course. In contradistinction to this, the granulation tissue of the tuberculous type, in most cases, breaks down early by caseous degeneration and produces ulcerations of a more or less destructive character, which are disposed to attack cartilage and bone at an earlier stage than in the lupic type, while cicatrization does not occur.

Granulomata, often of considerable size, are occasionally found in the tuberculous type, but not often in the lupic. Again, in the lupic form, even when at first intranasal, it is very apt to extend to the skin of the external nose, lips and face. In the tuberculous type, the disease commonly stays within the nasal interior.

Histologically, the lupic nodule is a miliary tubercle, but usually, instead of disintegrating by caseous degeneration, it disappears by cicatrization, while the tubercle of the other type undergoes the central caseaton and destructive softening characteristic of the typical miliary tubercle.

Summarizing then, the term lupic may be used to designate the well known type of mild slow cicatrizing tuberculosis, which resembles the fibrous type of pulmonary phthisis and which is less apt to destroy the structure it invades than to replace it with connective tissue.

The tuberculous type shows a tendency, on the other hand, to caseation and breaking down without the repair; this is characteristic of the more virulent forms of tuberculosis.

The large proportion of cases of the milder lupic form of tuberculosis in the nose indicates a vigorous resistance of its structure to tuberculous infection. So long as the disease remains intranasal, it will always be difficult, because of the many cases showing mixed characteristics of both lupic and tuberculous types proper, to tell to which of the two disease groups a given case should be assigned. But as the affections are etiologically one and differ merely in respect to prognosis and pathological changes, the distinction is not of great importance.

When we go into the etiological factors, the opinion prevails that the usual beginning of both the lupic and the tuberculous types on the foremost part of the septum is an evidence that the bacilli find lodgment in the nose as the result of direct inoculation, for the surface of the cartilaginous septum is especially subject to the impact of particles in the air current, to friction with the handkerchief, and to abrasions and eczematous conditions due to this friction and to picking the nose.

Hematogenous conveyance of the bacilli into the nasal tissues is thought possible in rare instances. While the authorities con-

cede that absolute proof that the tuberculous infection is primary is to be supplied only by an autopsy, it is nevertheless agreed that the course of almost all cases of the lupic type and that of many cases of the tuberculous type proper, indicates a primary tuberculous lesion. In spite of the exposure of the nasal passages to inhalation infection, the rarity of tuberculosis in this locality is explained as due to bactericidal qualities of the nasal mucus, the ejecting action of the ciliae of the epithelium and the protecting presence of a subepithelial adenoid layer of cells.

The patients afflicted with the disease usually present themselves with the subjective symptomatology of long standing and progressive nasal obstruction, accompanied by scanty viscid discharge and crusting. Objectively, the intranasal examination reveals one of four forms of involvement, namely, the tuberculous ulcer, the tuberculous tumor or tuberculoma, the diffuse infiltration, and the formation of granulation areas, the latter being the variety characteristic of the lupic type.

The tuberculous ulcer is usually secondary to pulmonary or laryngeal phthisis. The tuberculous infiltration which precedes this ulcer is rarely seen, as it creates no symptoms. The ulcer is usually found to be solitary and upon the anterior part of the cartilaginous septum. It is round, oval, or irregularly gnawed out and scalloped. Its floor is usually covered by a yellowish, thin, false membrane, out of which fungous, pale granulations arise. The tissue surrounding the ulcer is rarely congested, is often quite pale, and is commonly invaded and thickened by the tuberculous infiltration. The borders of the ulcer may be steep, but are usually shallow, and in almost all instances are so ill-defined that it is impossible to tell exactly where, beyond the ulcer, the intact epithelium begins, so much is it fretted by minute ulcerations scattered about the ragged edge of the central one.

While the tuberculous ulcer is seldom rapidly destructive and is usually slow to invade cartilage and bone, still, in the course of time, it produces perforations of the septum and caries. In spreading beyond its usual site on the septum, the ulceration commonly progresses across the nasal floor to the inferior turbinated bodies.

The tuberculous tumor or tuberculoma may be spherical, or lobulated, and may have a papillomatous, smooth or irregular surface, and may be pedunculated, but it usually has a broad base. The tumors are usually solitary, appear often on the cartilaginous septum and next in frequency upon the inferior turbinated body. Grayish red, or dark red or whitish in color, these growths may vary from pea-size to a mass which may completely fill the nasal chamber. Characteristically, these tumors are very friable and have a marked tendency to ulcerate.

The infiltrative form of this disease when actively progressing, is the most formidable variety of nasal tuberculosis. It produces diffuse swelling of the part of the nose attacked, which is usually the cartilaginous septum, with its overlying submucosa and perichondrium. Thus entering deeply into the frame work of the septum, the disease expands it in the form of diffuse, pale, pink, resistant swelling, whose surface may show granulations or ulcerations in places. In marked cases the thickened septum may appear like a tumor filling both nares and feel like a hard lump when the external nose is grasped. This was the situation two of my cases presented. The infiltration at times breaks down, leading to multiple septal perforations, with extensive destruction of the part. The disease is apt to advance into the external nose from underneath, causing it to thicken and broaden.

As before mentioned, the granulating form is typical of the lupic type, and commonly begins, as do the other varieties, upon the cartilaginous septum, and appears as a bed of grayish red raspberry area covered with scabs. This is the most benign of the various types of nasal tuberculosis. It usually spreads to different portions of the mucous membrane, but generally remains superficial. It commonly spreads to the external nose and may narrow the nasal introitus.

Microscopic examination of the tissues removed from the nose in this disease shows a diffuse infiltration of lymphoid and epithelial cells traversed by connective tissue bands, with often so great a scarcity of typical miliary tubercles and isolated giant cells that many sections may need to be examined before these objects are discovered. Tubercle bacilli are very difficult to find in the tissues and are usually found in the deeper parts of the products of the disease.

While the most important means of establishing the diagnosis is the histologic examination of the excised tissue, the microscopic findings may, nevertheless, be doubtful, because of the rarity of the elements distinctly tuberculous in the specimen examined. Typical miliary tubercles with a center of caseous degeneration and giant cells may be regarded as path-

ognomonic. The history of the case, its gross appearance, the finding of giant cells in fields of epithelioid and lymphoid cells establish the diagnosis with sufficient certainty, even if typical tubercles and bacilli are not found in the section.

Inoculation of suspected tissue into animals, even if they become tuberculous, does not verify the diagnosis, as it is impossible to exclude contamination of the specimen employed with tubercle bacilli accidentally present in the nares.

In the differential diagnosis we must bear in mind usually the following conditions; syphilitic ulceration and hyperplasia, benign and malignant neoplasms, rhinoscleroma, and other infective granulomata.

In considering the prognosis of nasal tuberculosis, we must bear in mind that it is commonly a benign and often a primary form of tuberculosis localized in a tissue little susceptible to the disease and permitting but few bacilli to penetrate it. If, therefore, the involved tissue can be carefully removed, recovery without a relapse is a possibility. In the lupic type, and more commonly in the tuberculous type, secondary deposits in the form of pulmonary tuberculosis, tuberculous meningitis, tuberculous lymphomas, joint disease, or some other form of tuberculosis may occur as long as the primary affection in the nose is not removed.

In considering the treatment of nasal tuberculosis, we must bear in mind that the structures forming the nasal cavity are not of vital or the highest functional importance. Again, the region is comparatively accessible, and for this reason, primary tuberculous tissue within the nose is somewhat favorably situated for the thorough surgical removal. As compared to surgical excision, all the other methods of treating nasal tuberculosis are far less certain in their results, some being but vaguely experimental, and they are only justifiable where the extensions of the disease have gone so far that surgical removal involves great disfigurement, such as the sacrifice of the external nose, or where these extensions have entered regions whence they cannot be removed by operation with the preservation of life.

Even a careful excision will, of course, give no insurance against a reappearance of the disease somewhere in the nose, for the least remnant of tuberculous tissue left will reproduce the disease, and in such instances, the tuberculous granulations must be followed up by secondary operations until they no longer return.

The measures which may be employed when the disease is beyond operation, are the excision of obstructing masses of tuberculous tissue as far as possible, curettement followed by lactic acid or electrolysis or galvanocautery, tuberculin, phototherapy, or some combination of these.

In conclusion and by way of summary, I want to emphasize the following points:

(1) Nasal tuberculosis is not an uncommon disease.

(2) It occurs in two types, the lupic and the tuberculous type proper.

(3) It occurs usually secondary to pulmonary and laryngeal tuberculosis, but can also be primary.

(4) The treatment is essentially surgical.

(5) Nasopharyngeal examination should be a part of the routine investigation in every tuberculous case, thus aiding the early diagnosis, which in turn means better prognosis.

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DISCUSSION

DR. D. F. HARBRIDGE, Phoenix, Ariz. (opening:—Relative to Dr. Schuster's paper, I fully appreciate the great importance of it, so much so that I really feel incompetent to discuss his very excellent contribution, and will leave that for those who follow.

But in reference to Dr. Stark's paper, I wish to remind you that we are dealing with a master mind in this particular branch of ophthalmology, as he is extremely well versed in it.

I do not suppose there are any of us who will be able to fully comprehend all the details of the tuberculosis question as it involves the various organs of the body. The rule was laid down by Calmette a good many years ago that if a child had tuberculosis before the fifth year, he might recover from the disease and the germ remain more or less dormant, and this rule is recalled in the statements made by Copez in the May number of Brit. J. Oph. in which he has observed that in certain individuals who show certain types of changes in the eye, there are found certain translucent, minute little bodies which are frequently overlooked. Since this was called to my attention, I have observed this condition in several instances, and in following down the history of such an individual you find in his history that he has given evidence of having had a tuberculosis disturbance of some character of one or another of his organs. This is borne out by the investigation of ninety-two cases of scrofulous eye diseases, made by Dr. Igersheimer. He was enabled in after years to trace these cases; he found that in not less than 13% they had developed tuberculosis. In other words, it emphasizes the point that very likely earlier in life, having

this infection, a certain immunity has been established. Later on in life, through a general depression, a renewal of the infection has occurred.

In relation to the eye, one of the very pleasing features about this particular branch of this work is that it is directly under your observation, and you are able to see with your own eye the different changes, although not of course the small microscopic alterations.

These tubercular breakdowns which we have in the eye are not always entirely dependent upon tuberculous infection; they may have, for example, an underlying cause, which may be tuberculosis, but the fire may be fed by infection from some other source. We can build a fire with wood and keep it up by pouring on gasoline, and relatively the same thing may be applied to the eye. The underlying cause, the growing ground, so to speak, may be prepared by tuberculosis, and later on in life your process may be carried on by some other type of infection.

Dr. Stark mentions the peculiar types of refractions, and another noticeable thing is the rapid and premature lessening of the accommodating qualities in the eye, to which they seem predisposed.

Regarding the subject of treatment, there is only one point I would like to criticize,—and the doctor is a warm friend of mine,—is that he says the eye should be protected from the light. It seems rather paradoxical that light should be a beneficial factor in tuberculosis, and then put on the patient a pair of dark glasses. I think you ought to let in a little light, doctor.

With regard to tuberculin, I would like to say that from my observations, in the few years I have used it, that one should begin with almost infinitesimal doses. I never think of beginning with more than 1/500,000 mg., which is almost nothing, as you know; in using these small doses you are gradually getting your patient in shape to become accustomed to the use of this remedy; as you climb up you find that with comparatively slight doses you get a distinct reaction. I have had several cases, one of which I have watched for years, as I have had her under my observation, having carried her along on 1/1000 mg. We have recently had a very severe reaction in this case with using 1/500 mg.

I just want to add a word to quote Dr. Jackson of Denver, with regard to the giving of tuberculin. He stated that "while such patients are enjoying good health ,a continuance of the good health depends upon his observing the conditions under which he attained it."

DR. H. T. BAILEY, Phoenix, Ariz.:—I think I could best discuss Dr. Stark's paper by reporting a case I have had.

This case I speak of was a young lady, seventeen years of age who came under my observation in July, 1922. She complained of pain in the eye and extreme lacrimation,—her eyes were constantly covered with tears. We got her quiet, putting in atropine and began to do the laboratory work, because we did not really know what was the matter with her; the Wasserman tests were negative, the gonococci and tuberculosis tests were negative and the urine was practically normal. But the Von Pirquet test was positive.

At first this young lady showed up white spots on the eye. that was on July 1st; on July 23rd we began with tuberculin treatment. In a comparatively short time she began to clear up, so that sometime in September the eyes were comparatively clear.

In October her tonsils were removed, and it was about the following April before we got her a pair of glasses. She was a nurse taking training, and of course we gave her rest treatment. After the course of treatment she resumed her work and seems to be all right; she is in the hospital working now.

With regard to Dr. Schuster's paper, the first report we have had on nasal tuberculosis was by Willen in 1798, when he reported a case of lupus of the nose; the next was by Willigh in 1752; he had done four hundred autopsies and found one tuberculous nose. Frielander was really the first one to show us that we had tubercular noses. Men like Mickel have stated that they never saw a lupus, and probably some others have stated that they never saw such a condition of the nose.

Along about 1882 to 1887 they began to pour in,—tuberculous conditions of the nose, and Dr. Schuster has gone into that so thoroughly that it would be a waste of time for me to repeat.

Perhaps we will wonder why we have tuberculosis of the nose, and there really is a great question as to whether we really have a primary tuberculosis of the nose. The probability is that it has been in the system, from which the nasal infection develops; sometimes it might be caused by a blow on the nose and scratching it, causing an abrasion, and the tuberculosis of the nose is the result.

It is reported that one woman contracted this disease from using the handkerchief of a man who had tuberculosis. A nurse is reported to have given tuberculosis to three babies. It was found that the nurse had a tuberculous ulcer of the maxilliary sinus which had broken through into the mouth. She had been in the habit of tasting the babies' food, and three of the babies contracted tuberculosis and died.

The reason we do not have more of this is because, principally, of the secretion. The secretion in the normal nose is one of the best antiseptic secretions of the body that we know of.

Eczema of the nose sometimes leads to tuberculosis of the nose, and then there is the tubercular tumor, or tuberculoma. As he has told you, sometimes it is so large that it fills the nasal chamber. He has described to you; after awhile it begins to break down into a cheesy material, and when you first see it you wonder whether it is an abscess; after this breaks down you have a tubercular ulcer.

I have only seen a few cases of tubercular sinuses. I have found one or two maxilliary sinuses with tuberculous conditions.

I believe that is all.

DR. J. W. LAWS, El Paso, Texas:—I am not capable of discussing these papers, as these gentlemen are specialists. But I do recognize the value of work done by men like Dr. Stark and Dr. Schuster.

We often have local manifestations before tuberculosis really developes. In taking the history of cases a man will often give a history of an infection that proved to be tuberculosis before any general tuberculosis was recognized.

I have had occasion to observe that in cases of underdeveloped, highly nervous people we would have, if their temperatures were taken, a subnormal in the morning with a temperature in the afternoon, and that when examined by Dr. Stark we have found definite indications of tuberculosis, where the physical signs did not show it. Now if it is possible to detect tuberculosis earlier in the eye, we certainly have in a work of that kind a very valuable contribution to medicine.

All of us know that our tuberculous patients have a considerable disturbance of the eye, and often refraction does not relieve this condition. Several cases of this kind have been relieved when it has been observed that there was a tuberculous condition of the eye.

I want to say further that I have administered tuberculin and have had Dr. Stark examine the eyes following the giving of certain doses, and he has been able to call a halt as to the size of the doses by the focal reaction in the eye.

I think the work done by Dr. Stark is a valuable contribution to medicine, and so far as I know he is a pioneer in that particular field of work.

DR. G. WERLEY, El Paso, Texas:—I have seen a good many of Dr. Stark's cases that he has turned over to me to administer tuberculin, and in treating twenty or thirty of them the results have been marked in all cases except one, that of a small child. In all of these cases all other means had been used by their physicians before coming under his care, and I have seen a number of these cases clear up almost immediately on tuberculin, even after having every other kind of treatment.

It seems to me that there is one point of resemblance between tuberculosis and syphilis, and that is that it becomes latent, just as syphilis does, but it is hardly ever thoroughly eradicated.

If I have the data correct in my mind, a person who has no tuberculosis will not react to tuberculin; and the fact that so great a number react to it must show that they are still infected with it, and are not really well; that it has not been eradicated, and this latent tuberculosis, just like latent syphilis, may be the cause of many unsuspected symptoms.

DR. H. H. STARK, El Paso, Texas, (closing): —In order to clear up a little misunderstanding of Dr. Harbridge, in these cases of intense astigmatic involvement, where you get a persistent headache and photophobia, (I think all of you men who know tuberculosis will recognize these cases) sometimes the pain is so intense, and they are so afraid of the light that it is impossible for them to stay in a bright light; these are the types that have persistent headaches, day and night. On the other hand, the principle treatment for localized lesions is the same as that used in general tuberculosis;—that is, of rest. In addition to that, dilate the pupil, which gives them the benefit of heliotherapy. There is no question but that many of these cases would get well by dilating the pupil and giving the eye complete rest.

The doses of tuberculin to be given depend largely on the individual case and on the doctor using it. As you go along you become much more efficient and competent in the use of this remedy and the doses to be given. The initial dose is the dangerous dose,—that is to the eye. I think I failed to express the point that in active tuberculosis we do not use tuberculin at all; it is rather the latent cases that I am speaking of.

As I have just said, the initial dose is the dangerous dose. If you could see the reaction, you would be startled by the small amount necessary to produce it. The pupil should always be dilated, because the exudate will sometimes completely fill the pupil, and you do not want that to happen; that is to be avoided. The smallest focal reaction we can get is the one we want.

Of course we all accept the fact that you can give an individual without tuberculosis any size dose of tuberculin. I think there are instances of 100 mg. being given without bad results. In starting giving it, the doses should be very small, not more than 1/5000, and the reaction will be slower. The case Dr. Bailey has described is typical. The spots he mentions, white spots, or little light colored spots, perhaps two or three of them, gradually coalescing. in some instances they get into such a mat that the person can not see at all, and it will completely cover the cornea. This type of case, the way it develops, is typical of tuberculosis and these spots disappear very rapidly after taking tuberculin. In some cases you may find with white or light spots on the cornea, the spots will disappear spontaneously. These are practically all done by the use of tuberculin.

DR. S. A. SCHUSTER, El Paso, Texas (closing):—I would like to make the point that nasal tuberculosis is almost always secondary. Primary nasal tuberculosis is a possibility,—I would rather put it that way, as it illustrates my point.

A typical case I had of tubercular ulcer was a Mexican boy; he could not get any air into the nose at all. He was a very acute case; he passed into coma and shortly after died of tuberculous meningitis. The nose was absolutely filled with a tuberculous mass, the nasal passages being so narrowed that you could hardly see an opening. This is the kind of a case that makes nasal tuberculosis a reality, and stimulates earlier diagnosis.

I want to thank Dr. Harbridge and Dr. Bailey and others for their discussion, and I would like to express the point that nasal examination should take place in all tuberculosis suspects.

DR. T. T. CLOHESSY, who has been located at Buckeye, Arizona, for about three years, recovering from a physical breakdown and attending to the community practice, has moved into Phoenix and resumed the practice of his specialty of Dermatology. Dr. Clohessy will have offices in the Luhrs Building, and will be a welcome addition to the medical fraternity of Phoenix, where the need for a dermatologist has frequently been felt. Prior to coming to Buckeye, Dr. Clohessy practiced dermatology in Kansas City.

AMERICAN COLLEGE OF SURGEONS SECTIONAL MEETING IN EL PASO

The Sectional Meeting of the American College of Surgeons for the district including Texas and New Mexico will meet in El Paso February 5th and 6th. The headquarters will be at the Del Norte Hotel. A very excellent clinical program is being prepared by the local members of the College and a number of prominent speakers will be on the evening programs. Included among the outside speakers will be the following:

Dr. M. T. McEachern of Chicago, on "Standardization of Hospitals."

Dr. Allan Craig of Chicago, on "Tuberculosis and Timely Health Topics."

Father C. B. Moulinier, S. J., on "Scientific Medicine."

Dr. J. O. Polak of Brooklyn, N. Y., will present a paper.

Dr. A. W. Adson, of the Mayo Clinic, will have a paper.

Effort is being made by the Local Committee to arrange a special clinic for Dr. Edward Jackson, of Denver, Colo.

Members of the medical profession generally throughout the southwest are invited to this meeting.

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OUR NEW STYLE

With this issue, several changes are inaugurated in the management and style of the journal.

In the first place, the business management is taken over by the publishers (The A. C. Taylor Printing Company), and they will have entire charge of the advertising pages. All correspondence about advertisements should be directed to them.

The Editorial Staff remains unchanged for the year, except that a new Associate Editor has been selected for El Paso County (Dr. Varner, succeeding Dr. F. O. Barrett).

Our change in style consists in our joining the ranks of those journals whose reading pages measure 6 x 9 inches. Our advertisers are thus given an advantage of a larger page without increase in cost to them. Our number of reading pages will be slightly reduced without cutting down the amount of material published. The columns will be 3 x 9 inches, which will improve their appearance considerably. We believe the titles of papers as they appear this month represent an improvement over the old style.

We take the journal into its fourth year under the present management, confident that it will continue to grow and deserve the cooperation which we hope to receive during the year.

A NEW AND BETTER YEAR

We extend to the readers of SOUTHWESTERN MEDICINE a cordial greeting, and our hopes for a successful and Happy New Year. At the beginning of the fourth year for this journal under its present management, we are hopeful for a better journal in many respects during 1925 than has been supplied during the past three years. But the realization of this expectation will depend on several things. The editor of a journal like this must needs have a sublime faith in his professional brethren, because the success of such a journal does not depend on the editor but upon the cooperation of those same brethren.

The editorial department of this journal is not, itself, a creative activity. Its function is to arrange and present to its readers information regarding the medical activities of organized medicine in the southwest. It is obvious, therefore, that unless we are supplied with this information from month to month, the reading pages of the journal will fail in their function. We are convinced that the printing of scientific papers is a minor function of this journal, and that we will never find our field of usefulness as the OFFICIAL ORGAN of the constituent societies, until these pages reflect to the minds of their readers the activities of all organized societies in the southwest, as fast and as often as those societies function in any capacity. The scientific papers which we print are not of value in themselves, primarily, but are worth while in so far as they tell the medical profession of the southwest what other medical men in that district have been hearing, think about or doing.

There are three lines of activity which must be exploited in these pages, and three groups of people who must use this journal to broadcast their messages to the profession of the southwest, if we are to find our rightful sphere in 1925. These are:

FIRST:—The national organization's activities and the American Medical Association's officials. There will be no difficulty here. The national organization will speak as often and as long as we find it advisable to give them space. It is the purpose of this journal to concentrate upon organization work during the coming year, to the end that every reputable doctor in the southwest is affiliated with the county, the state, the district and the national societies. It is not fair nor proper to stop with the county and state organizations in our campaigns for members; we have not completed the work until all of our county and state members are Fellows of the American Medical Association. More about this later.

SECOND:—This journal is the direct mouthpiece of the four societies which own it. The secretaries of the two State Associations, of the El Paso County Society and of the Medical & Surgical Association of the Southwest should reach their constituents through this journal. No issue of the journal should go out without a direct message of some sort from these officers. Each secretary should have a department in the journal and should present therein the activities of his office. The same is true of the councillors of the state societies. The only definite function of the councillor is stated in the constitution to be that he shall visit each of the societies in his district at least once a year; when he does so, he should report the conditions found through the pages of this journal. These four organizations each appropriate a large proportion of their annual dues in sending the journal to their members and in subsidizing the editorial expenses of the journal. The secretaries are supposed to secure the value of that appropriation for their respective societies by utilizing the journal to build up those societies and weld their constituents together into a unified organization. This has not yet been done by any one of them, with the possible exception of the present secretary of the New Mexico Society; he has the idea and needs only to enlarge upon it a little.

THIRD:—This journal is the direct bond of union between the county societies over the entire southwest and the medical profession of that district. Every activity of every county society in New Mexico and Arizona should be promptly and fully reported in this journal. That can be said, without any qualification, to be the most vital task of every county society secretary. This is stated deliberately, after many years of experience as secretary of all kinds of medical societies. Properly and adequately publishing an account of the LAST meeting is of more importance than arranging for the NEXT meeting, because the success of the next meeting will be assured if the last meeting is properly exploited in print. County secretaries are no more than human. Most of them who accept that thankless job want encouragement in their work. We know of one county secretary who was faithful in sending reports of his meetings, and they were more interesting than most of the scientific papers published. Some member of his society spoke slightingly of his reports, and that was the end of any record of that society's activities. That member would have performed a better service had he resigned from the society, instead of discouraging a faithful secretary's good work. The point we wish to make, here, is that the members of county societies should encourage their secretaries to send in reports; compliment him on them when they appear in print; criticize him if he fails to report his society's activities. This journal is open for any paper read before a county medical society and sent in by the secretary of that society. Such papers represent an activity of a society, and as such they have first claim on the space in this journal. If we had to choose between the publication of an exclusive paper by the most eminent physician or surgeon in the country and the publication of a paper read before his county society of a dozen members, on "How to Wean a Baby," by Dr. Reuben of Podunkville, Ariz., the eminent doctor's scholarly contribution would go into the waste-basket or be returned to him, without a tear shed. It would give us great joy to take Dr. Reuben's presentation, correct the spelling and punctuation, if it required this, typewrite it for him so the printer would accept it, and print it as the leading article in the journal. Why is this? Because Dr. Reuben is a member of **our** family of the Southwest. What he says and what he thinks, whether it is right or wrong, means infinitely more to us than what any eminent "outlander" says or thinks. We can get the ultra-scientific contribution of Dr. Outlander from some other journal, but unless THIS journal reflects the ideas of Dr. Reuben to our readers, we will never get acquainted with him. Right there we

will stop, with the promise of an editorial next month on Dr. Warnshuis's first requisite of a successful medical organization, "Get Acquainted." Watch for it.

EL PASO COUNTY MEDICAL SOCIETY MEETING, NOVEMBER 24, 1924

The meeting was called to order by the president at 8:25 p. m. There were present twenty-two members and several visitors, among whom were Dr. Ralph Homan, Mr. Sol Wolf and Mr. Wallaker. There were also eleven dentists present, among whom were Drs. Bauchert, Neil, Mengel, Izard, Akeroyd, Robinson and Hoenes.

The papers at this meeting were presented by dentists of the El Paso Dental Society. The minutes of the previous meeting were not read and there were no case presentations.

The first paper of the evening was read by Dr. N. F. Bauchert, entitled "Focal Infection of Dental Origin."

The two papers being of such closely allied nature, the president announced that discussion would be deferred until after the second paper.

The second paper was read by Dr. L. A. Neil, entitled "Periodontal Pathology, or the So-called Pyorrhea Alveolaris." Dr. Neil illustrated his paper by some excellent slides, which particularly demonstrated the growth of bone around the teeth, following treatment of the teeth for this disease.

The papers were very interesting and attracted much attention, and were discussed liberally by Drs. Leigh, Werley, Davis, Strong, Turner and Branch, among other physicians, and Dr. Robinson, for the dentists. Discussion was closed by Drs. Bauchert and Neil.

The president announced that on December 1st, the date for the annual meeting, a concert which had been scheduled for Miss Alma Gluck on that same date, had been cancelled, and that unless otherwise desired, the meeting would be held as usual on Monday evening, December 1st, instead of Tuesday, December 2nd, as previously planned.

The president also announced that Lieutenant Colonel Shockley had invited the Medical Society to meet at Beaumont Hospital on December 8th.

The president announced that it had been customary to discontinue the Society meetings after the annual meeting until after the first of the year and asked what the members desired to do about it.

Dr. Werley made motion that we adjourn until the first January meeting, after the meeting of December 1st. This motion was seconded by Dr. Cummings and carried.

There was no other business and the meeting adjourned at 9:45.

F. O. BARRETT,
Secretary-Treasurer.

EL PASO COUNTY MEDICAL SOCIETY ANNUAL MEETING (DECEMBER 1, 1924)

The annual meeting of the Society was held at the University Club, December 1, 1924.

The meetnig was called to order at 8:07 p. m. by the president. There were present 52 members and two visitors. This meeting was devoted entirely to the election of officers and a general meeting of good fellowship, punctuated by doughnuts, cider and cigars.

Dr. W. L. Brown made a motion that appropriate resolutions be drawn in consideration of the death of Dr. Paul Gallagher's little boy, which occurred on Friday morning, November 28th. The motion was seconded by Dr. Hardy and carried.

The president appointed a committee composed of Drs. Hardy, Leigh and Cummings to draw such resolutions and empowered them to forward the same in view of the fact that there would be no other regular meeting for the rest of this month.

The president called upon Drs. W. L. Brown and C. M. Hendricks, two past presidents, to act as tellers in the election of officers. The first ballot cast was for nomination for president, in which the two highest were Dr. E. B. Rogers, 21 votes, and Dr. Hardy, 15 votes. There were 48 votes cast. For election, there were 51 votes cast, of which Dr. Hardy received 27 and Dr. Rogers 24, and the president announced the election of Dr. John A. Hardy as president for the year 1925.

The next ballot cast was for nomination for Vice President. There were 47 votes cast, the four highest being Drs. Cummings, C. P. Brown, Will Rogers and E. B. Rogers, each of whom received five votes. Having served as Vice President heretofore, both Dr. Cummings and Dr. E. B. Rogers asked to be allowed to withdraw from the race, and the ballot for election was cast between Drs. C. P. Brown and Will Rogers. Dr. C. P. Brown received 19 votes to 12 by Dr. Will Rogers. The president announced the election of Dr. C. P. Brown as Vice President.

The next ballot was cast for nomination for Secretary-Treasurer and Associate Edi-

tor of Southwestern Medicine. The three receiving highest votes for nomination were Drs. Darnell 14, Varner 9, Barrett 9. Dr. Barrett announced that he had already served two years and wished to be relieved, declining to serve another year if elected, whereupon the ballot for election for this office was cast for choice between Drs. Darnell and Varner. Dr. Varner received 27 of a total of 48, and Dr. Darnell, 19 votes. The president declared Dr. Varner elected as Secretary-Treasurer and Associate Editor of Southwestern Medicine.

The next in order was the election of delegates to the State Association meeting. The president announced that the four receiving the highest number of votes would be voted upon for election, the two highest of which should be delegates and the other two alternates. For nomination, Dr. Will Rogers 22, Dr. McCamant 11, Dr. W. L. Brown 13 and Dr. Hendricks 14, were the highest. In the final vote, Drs. Brown and Hendricks were declared by the president as elected as delegates, and Drs. Will Rogers and McCamant were declared to be elected as alternates.

Next in order was the election of Censors, two of whom were to be chosen. For nomination, the three highest were Drs. Cummings 6, Duncan 6 and Witherspoon 10. For election Dr. Cummings received 17 votes and Dr. Duncan 24. These two were declared by the president to be elected, and it was determined by the president that they should "cut" for the two and three year positions.

Dr. Darnell was elected as representative of the American Society for the Advancement of Science, having received a very large majority of the votes.

For Librarian, there were 23 votes cast for nomination, of which Dr. Prentiss received 8 and Dr. Egbert 6. At this point discussion arose as to whether or not this was an elective position and upon referring to the by-laws it was determined that the librarian should be appointed by the Executive Committee, so none was chosen at this meeting.

The meeting adjourned at 10 p. m.

F. O. BARRETT,
Secretary-Treasurer.

MARICOPA COUNTY MEDICAL SOCIETY

(Phoenix) Annual Meeting.

On Saturday evening, December 20th, the Maricopa County Medical Society met for its annual meeting, at the Arizona Club. The meeting was preceded by a banquet, tendered by the society to its members and their wives. About forty members with their ladies were in attendance.

The Women's Auxiliary of the Maricopa County Medical Society is a very active and welcome addition to the professional life of the community. More such mixed dinners and meetings are being proposed for the coming year, probably every two months. The combined meetings will give a chance for the wives of members to become better acquainted and to organize for the purpose of entertainment of visiting ladies when medical meetings are held in the county.

After the dinner, the ladies adjourned to another room, for mah jongg and bridge; they reported a good time and uncovered several players who would compare with the doctors as diagnosticians. (It is not stated whether these players are good or poor.—Ed.)

The members of the society convened in regular session, the first business being the election of officers for the coming year. The election resulted in the following officers:

President—Dr. Geo. M. Brockway, Phoenix.

Vice-President—Dr. Harry J. Felch, Phoenix.

Secretary-Treasurer—Dr. R. J. Stroud, Tempe.

Member of Board of Censors—Dr. J. J. McLoone, Phoenix.

The scientific paper of the evening was by Dr. Watkins on "The X-Ray Evidence of Mixed Infection in Lung Tuberculosis." This was illustrated by slides, showing the characteristic appearance of tuberculous lesions on the x-ray film, and the development of the disease from a single lesion to extensive involvement. He stated that the tuberculous lesion is apical or upper lobe almost invariably, and that it has a characteristic relation to the bronchial tree and a characteristic appearance on the film. Mixed infection shadows may appear anywhere, but usually in the bases or near the hilus, have no definite relation to bronchi, are more likely to be irregularly discrete, and lack the characteristic appearance of the tuberculous lesion. He raised the question as to the distinction between chronic lung abscesses and tuberculous cavities with mixed infection, both as regards diagnosis and treatment. He also raised the question as to the resolution of tuberculous foci, and whether they ever disappear without leaving densities behind. He stated that the x-ray densities were simply a refinement of physical examination, being the means of extending inspection to the interior of the lungs. This is true even when

the x-ray represents about all the information obtainable about the lung pathology.

In the discussion, Dr. Holmes stated that he believed that the physical signs would indicate tuberculosis in some cases where the x-ray was negative; also one case shown on the screen as lung abscess, he regarded as tuberculous cavity; he thought the history of the illness would indicate pretty accurately whether a cavity was lung abscess or not; he also believes that tuberculous consolidations will disappear by resolution, as proven in animals by Gardner.

Dr. Phillips thought that the differentiation of tuberculosis from mixed infection would be very valuable, and that this could be aided by observation of the lungs at postmortem. He did not think the treatment of chronic abscess cavity and infected tuburculous cavity differed materially.

Dr. Smith stated that Dr. Watkins had forgotten something he taught more than five years ago; this was that the physical signs would appear in a tuberculous lung before the x-ray shadows would show tissue changes; he believes that this is true, and thinks it is frequently demonstrated in his experience.

Dr. Bannister stated that he thought

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the differentiation of chronic lung cavities as tuberculous or pyogenic would be important, and the decision that certain types of infection in the lungs are non-tuberculous would be a decided aid to treatment.

Dr. Tuthill considers that these studies give promise of being very valuable in the diagnosis of lung pathology and hopes they will be continued.

In closing discussion, Dr. Watkins stated that he thinks the chief difference between a chronic abscess cavity and a tuberculous cavity with a pyogenic membrane lining it is in the formation and the mechanical structure usually resulting. This results in much better drainage of the tuberculous cavity which is its chief difference. He also thinks that x-ray has made advances in the past five years and that the failure to show densities in the lung wherever there is actual tissue change is purely technical and not due to the nature of the pathology. An early lesion may fail in demonstration through proper technic, the patient may breathe slightly or move slightly, or the film not be sufficiently clear, and the radiologist will unwisely report no visible pathology. It is not conceivable that actual infection by tuberculosis will proceed to the point of physical signs and clinical evidence, without such tissue changes as are demonstrable by the x-ray; if we consider the innumerable instances in which the physical examination has failed to detect any variation from the normal in physical signs and yet the radiograph will show gross changes, detectable at a glance, it should make us pause and consider seriously the diagnosis of tuberculosis in the absence of any x-ray signs of tissue change.

Dr. Vivian presented a case of Exfoliative Dermatitis in a man; he asked that comment as to probable cause be not discussed before the patient. The result was attributed to an arsenical manifestation following an injection of neoarsphenamine. Dr. Vivian believed that the lack of kidney excretion accounted for the trouble. Dr. Stroud thought it was due to the patient's not being properly alkalinized, or perhaps the preparation injected was at fault; he had just had two such cases himself. Many cases in army practice during the war followed injection of faulty arspenamine.

Dr. Vivian was on the program for a paper on "Psychic Impotence," but the hour being so late, this paper was held until another meeting.

Dr. Vivian, the retiring president, thanked the society on behalf of the retiring officers, for their cooperation in making the year a successful one from many standpoints.

The meeting adjourned shortly after ten o'clock.

R. J. STROUD,
Secretary.

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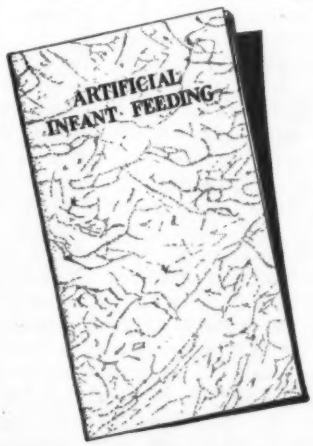

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STAFF MEETING OF THE ARIZONA DEACONESS HOSPITAL (Phoenix)

The Medical and Surgical Staff of the Arizona Deaconess Hospital met for its regular monthly meeting at 8:15 p. m. Saturday evening, December 27th, with the following doctors present: Shelley, Smith, Thayer, Couch, Schwartz, McIntyre, Greer, Shields, Thomas, Wilkinson, Watkins, R. C. Martin, Vivilan, Felch, Little, Drane, Mills, Garrison, Franklin, Goodrich and Brown.

Dr. Goodrich, Chairman of the Staff, presided.

The chairman announced that a coat room in the main corridor had been provided by the hospital for the use of the doctors; a telephone and toilet are there for the physicians' and surgeons' convenience, and later better furnishings will be provided.

The chairman further announced that Miss Kettlewell complained that the doctors are not having reports of consultations placed in the histories.

The secretary asked to whom the notices of our meetings should be sent. The concensus of opinion was that they should be sent only to the members of the staff. Moved by Dr. Shields and seconded by Dr. Smith that all reputable men of the city not now members of the staff be sent letters asking them to join the staff. Carried.

The secretary asked if it would meet with the approval of the Staff if the program committee were to select a committee of physicians to study and discuss groups of histories for the program. Moved by Dr. Greer and seconded by Dr. Shields that the program committee be empowered to appoint committees to study and discuss such case histories as the program committees may select and if the physicians in each case approve, for the purpose of getting prepared discussions for the programs.

The motion was generally discussed. Dr. Smith said the arrangement might breed conservatism in making the history. Others said such a practice should lend to an improvement in the character of the records. The motion carried unanimously.

The scientific program was called for by the chairman. The program committee had arranged that the records of the eight deaths occuring in the hospital during November should constitute the program for the evening.

Records of Case No. 3139 were read by the secretary. Abstract of records in the case follows:

Female 21 years of age. Admits self-attempted abortion; complains of cramps in abdomen, nausea and vomiting; abdomen rigid; no localized tenderness; uterus enlarged to about four months pregnancy; cervix dilated but not shortened. pulse 116,

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Soak for ten minutes one level tablespoonful of Knox Sparkling Gelatine in ½ cup of cold milk taken from the baby's formula; cover while soaking; then place the cup in boiling water, stirring until gelatine is fully dissolved; add this dissolved gelatine to the regular formula.

For children and adults follow the same method in the proportion of ½ teaspoonful of gelatine to a glass of milk. Because of its purity, it is essential to specify Knox Sparkling Gelatine.

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First—An absolutely safe and trouble proof apparatus.

Second—Simplicity of adjustment and use.

Third—An apparatus that permits of treating several patients in a chamber or home and also another type with which an individual treatment can be given—both to be portable.

Fourth—Economy of use.

Fifth—Low cost and long life.

1. The personnel of the National Research Laboratories has had long experience with chlorine gas, and while the dangers connected therewith have been greatly magnified there can be unpleasant circumstances connected with its application that are guarded against in the Gilchrist Chlorine Ejector. *It is not necessary to have a cylinder of gas in the presence of the patient.*

2. We have stripped the apparatus of all unnecessary appurtenances, insuring a minimum of effort in its use and the least possible adjustment.

3. The physician will be called upon to use one type for treatment in a chamber or home when the individual type would not be suitable, for instance in treating very small children. *Many physicians due to lack of space cannot have a chamber connected with their offices.* Therefore we have developed and placed on the market the Individual Type.

4. There are features connected with either type that permit of its use anywhere, and the greater quantity of pure chlorine gas in our cylinders insures a very low upkeep cost to the physician.

5. *The initial cost of the Gilchrist Chlorine Ejector is positively the lowest obtainable.* Simplicity of construction means low manufacturing cost. Still there has been no skimping that would detract from its efficiency, safety or appearance.

The Gilchrist method of chlorine treatment and the Gilchrist Chlorine Ejector were devised by Lt. Col. Harry L. Gilchrist of the Medical Corps of the U. S. Army.

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Individual Type $20

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Both Types with Two Cylinders $75

Individual Type Chlorine Ejector is made of crystal glass and polished hard rubber with *no metal parts to corrode*. Attached is the inhaler made of non-corrosive parts. The carrying case is of mohagony finished wood.

THE Individual Type of Gilchrist Chlorine Ejector designed especially for physicians who find it impractical to install a chlorine chamber in their offices and also for the additional advantage enabling them to furnish to their patient an ejector that may be taken to the home or office.

The simplicity of this device will appeal to the medical profession, as the physician or his assistant can charge a dozen of these indvidual types in fifteen minutes and have them ready for service.

This type is operated on the same principle as the other Gilchrist Ejectors. Only 50 c.c. are needed for the hour treatment, being injected into the device direct from a cylinder of pure chlorine, the cylinder then being laid aside for future use.

With the outlet apparatus adjusted (suspended about the neck, and resting just below the nose of patient) the patient opens the control valve, thus permitting the gas to seep out over the period of one hour and the gas mixing with the air gives just the concentration required.

When filled this type can be carried to the home or office by the patient without any loss of gas, or the slightest danger. No complicated adjustment is required by the patient and it is absolutely safe.

Improved Chamber Type $25

With Two Cylinders $55

Both Types with Two Cylinders $75

The improved chamber type made of crystal glass and polished hard rubber with *no metal parts to corrode*. The carrying case is of mahogany finished wood with compartments for two cylinders.

THIS type is for use in a physician's gas chamber, the hospital, or it may be transported to a home and a treatment given there, when the individual type is not suitable, (such as in the treatment of small children for whooping cough.)

The physician or his assistant can easily turn into this ejector 600 cubic centimeters of pure chlorine gas, tighten a valve and the ejector is ready for use or transportation.

Upon entering the chlorine chamber or room in the home, the desired initial concentration is turned on, depending upon the cubical contents of the room.

Now by a simple adjustment the device is set to allow, for instance a seepage of 400 c.c. during one hour which automatically maintains the required concentration, to take care of absorption of gas by the patients or furnishings of the room.

A chart accompanying the ejector gives required initial concentration for any sized room and required amount of seepage.

The chamber ejector has a capacity sufficient for the largest room likely to be used. Lesser amounts of gas can be employed as the occasion requires.

With this type it is not necessary to take a cylinder of the gas into the home or chamber. It has no complicated mechanism; is simple, safe and durable.

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temp. 96.2 rising in 4½ hrs. to 100.6; resp. 30; leucocyte count 15,600; 89% polynuclears, urine 1029, trace of albumin, occasional cast; blood culture negative; curettement 36 hrs. after admission. Improved for several days, after which there was a stormy course—death 12th day.

Dr. Garrison said that it had been his experience that if it is desired that the abortion should not proceed, scopolamin should not be administered. This drug with morphin always assisted the emptying of a uterus.

Dr. Thomas said that the experience of maternity hospitals in the East, and his personal observation, is that infected cases of attempted abortion should not be curetted. He detailed one case in which there was a most offensive odor and high fever, and under ergot and other medication the fetus and placenta were expelled after about five days and the patient made an uneventful recovery.

Dr. Smith concurred in what Dr. Thomas said and said further that an infected area as a rule should never be curetted.

Dr. Brown asked if remnants of decaying placenta were not good cultural material for bacteria that might be carried in by the instruments and if it were not extremely difficult to avoid infection during curettage in such cases; also said that he recalled two cases, one indirectly and one by consultation, of retained placenta following normal delivery of the children. In one case the doctor waited and waited for about three days when the placenta was finally expelled without instrumental aid. The other physician after a short wait interceded and delivered the placenta by means of curettes or other instruments; so it was rumored. The woman who was not operated lived and the other died.

Dr. Smith said further that pyogenic or saprophytic bacteria might be carried into the uterus in a curettement and that the decayed placental remnants afforded a good cultural bed.

Dr. Watkins reported that the laboratory had recently found placental material in a uterine discharge and the last pregnancy had been eight months previously.

Dr. Little said that in streptoccic infection he would advise against curetting but in milder infection it may be advisable to curette.

Dr. Vivian said that instrumentation in infected cases is an acutely dangerous procedure. He detailed a patient that had inserted a hat pin in her uterus to produce abortion. When he first saw her she had a high temperature and was acutely ill, with every evidence of sepsis. The uterus was not attempting to empty itself. She

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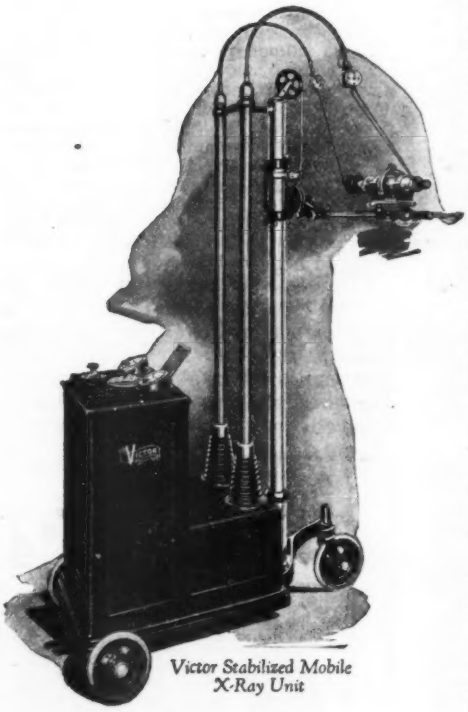

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was given mercurochrome intravenously and finally after the fourth to fifth day of severe illness, the uterus emptied itself; and the patient made a complete recovery.

Dr. Goodrich called Dr. Watkins to the chair at this point as he was compelled to leave the meeting.

The records of Case No. 3170 were read in detail by the secretary.

An abstract of the records follows:

Male, age 79, with "double inguinal hernia, hypertension artereosclerosis, and tenderness over entire abdomen." On admission, temp. 98.6, pulse 78 and resp. 20. Urine involuntary; bedside notes say "complained of pain in abdomen."

Temp. on 2nd day rose to 102 (axillary) pulse 118 and resp. 30. Death on 3rd day. Diagnosis—Acute gastro-enteritis.

Dr. Vivian said that he had seen this man in consultation and that it was his opinion that this man had had during the first night in the hospital a cerebral hemorrhage.

Dr. Watkins said that it was his opinion that the physician in this case would doubtless change the cause of death as it now reads if his attention were but called to the matter.

Case No. 3203 was next on the program; the record was voluminous, being that of a female, age 38 years; diagnosis pulmonary tuberculosis, treated by pneumothorax; in hospital 272 days.

Dr. Vivian, physician in charge of this case, said that this was a case of advanced pulmonary phthisis treated with pneumothorax and there was nothing of special interest concerning the case.

The secretary read the records of Case No. 3242, an abstract of which follows:

Graduate Nurse. Age 54, with history of two previous "heart attacks" relieved by digitalis, and rest. The patient was so ill that a detail history was impossible. Present attack began two weeks before; under care of a chiropractor. Chief complaint was breathlessness of asthmatic type especially on slight exertion. After a few days a pain in cardiac area began and became very severe; opiate necessary; physical findings: large heart, asthmatic rales; purulent sputum, slight edema. Blood pressure low at first and rising after treatment. Urine 1030. Albumin .1%. Blood normal. Death was sudden with a violent scream of pain—a grasp at the heart.

Dr. Brown then discussed cardiac infarct as Dr. Werley presented the subject to the Southwest Medical Association. He read from Dr. Werley's paper as follows:

Cardiac infarct is only considered rare because the diagnosis is so often missed. In a little over one hundred autopsies seen in El Paso during the last year and a half, there were seven cases of cardiac infarct, fibrous myocarditis or cardiac aneurism. If the heart could have been examined in every case of sudden death from so-called acute "heart failure," "ptomaine poisoning," "acute indigestion," or "stroke," I am sure the percentage would have been much greater.

Cardiac infarct does not differ from infarct in other parts of the body except as modified by differences in tissue structure and function. Cardiac infarct caused by embolism is a very rare event. Sclerosis with atheromatous degeneration and calcification are found in practically every case. The same causes are at work as in arteriosclerosis in other organs of the body. Just why a clot will form in one calcified artery and not in another equally damaged we do not know.

The symptoms of cardiac infarct are just what we might expect. They are: 1. Those due to the local lesion in the heart.

From the infarct with its congestion, edema, damaged muscle, necrosis, infiltration of polymorphonuclear leucocytes and pericardial palstic exudate, we have (a) fever, (b) Leucocytosis with high poly count, (c) pain, and (d) pericardial rub.

2. Those due to heart failure.

The sudden crippling of the heart gives rise to (a) pulmonary edema and congestion, sometimes hemoptysis, (b) dyspnea, (c) vomiting, sometimes gastric hemorrhage, (d) swollen liver, (e) cyanosis (f) dilation of the heart (g) feeble or absent sounds, (h) fall of blood pressure, (i) restlessness, (j) vasomotor signs such as flushing or paling, (k) finally, if the lesion is bad enough, shock, collapse and death.

If one will remember these facts diagnosis will not be difficult. The surgical mind may confuse it with acute pancreatitis, ruptured duodenal ulcer or gall bladder.

Dr. Brown said that since hearing Dr. Werley's paper he had seen two cases which he believed were suffering from coronary artery thrombosis. The case under discussion had had two previous attacks of cardiac distress in which digitalis and rest relieved her. These attacks may have been

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The suggested modification furnishes nutrition in keeping with the character and amount of food element best adapted to the particular demands of infants in an extreme state of emaciation and serves well as a starting point in attempting to meet the nutritive requirements of these undernourished babies.

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due to small thrombi in the coronary arteries. The important features in this case pointing to thrombosis were: a large heart failing to respond to digitalization; prolonged severe pain in the heart region calling for opiates to relieve; the sudden death with patient shrieking out and grasping at heart region; the face first pale and immediatetly followed with flushing; first red changing rapidly to purple and then blue.

Dr. Drane discussed the case emphasizing the two previous cardiac attacks which the patient had had.

Dr. McIntyre said he had seen the woman six years ago, at which time she had marked edema even pulmonary, high blood pressure, and had to stop work for a time, but that she could not be prevailed upon to take proper treatment.

Dr. Mills said that he felt that it was necessary to distinguish between cardiac infarct and coronary sclerosis; that thrombosis does not occur without infection. Causes of sudden death were often gummatous thickening of the coronary wall; a syphilitic endarteritis. The gumma encroaches upon the vessel and gradually breaks down and occludes the vessels.

Dr. Vivian said that in Dr. Cabot's Case Histories there were cases of sudden death from a ball-valve clot of right auricle. He thinks this may explain the cause of death in this case.

Dr. Felch, County Health Officer, reported that he had had to do many autopsies in the course of his official duties and that any of the physicians were welcome to attend them.

The remainder of the program had to be deferred for lack of time.

Adjourned.

DR. ORVILLE HARRY BROWN,
Secretary.

At the December meeting of the Staff of St. Mary's Hospital, Roswell, New Mexico, Dr. H. A. Ingalls was elected Chairman and Dr. Chas. F. Beeson, Secretary. The retiring Secretary, Dr. C. M. Yater, asked to be relieved of the further duties of the office, as his duties as Secretary of the New Mexico Medical Society claim most of his spare time.

Dr. A. E. Fletcher, a retired physician very popular with the regular profession in Roswell, died suddenly on the morning of December the 26th, supposedly from uremia, and was buried at Roswell on the evening of the 31st. Dr. Fletcher, while not in practice, always took an earnest interest in medical matters and will be missed by the Roswell profession.

CHAVES COUNTY (NEW MEXICO) MEDICAL SOCIETY

The Chaves County Medical Society met in regular session at the usual hour, December 31st, and, after the preliminary proceedings, had the pleasure of listening to a good paper by one of the members, Dr. J. E. McClane, on the subject "Bronchopneumonia in Children." Dr. McClane seemed to be conversant with his subject and brought out some excellent points in the management of these cases.

After the discussion was closed the society went into business session, and elected the following officers for the year 1925:

President - - Dr. C. F. Beeson, Roswell
Vice-Pres. - - Dr. J. E. McClane, Roswell
Sec.-Treas. - - Dr. C. M. Yater, Roswell

Board of Censors

One year term - - - Dr. W. C. Buchly
Two years - - - - - Dr. E. M. Fisher
Three years - - - - Dr. W. T. Joyner

Delegates to State Society

Dr. W. T. Joyner Dr. H. S. Ingalls
Dr. D. D. Swearingen

On the sixth of January the society will hold its annual business meeting and banquet, and the Eddy County Medical Society is invited and expected to meet with us at that time.

C. M. YATER, Secretary.

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MEMBERS AT LARGE, New Mexico Medical Society

Annual dues for 1925 are now due and payable. The dues are $5.00. You will confer a favor on me and relieve me of considerable work if you will sit down right now and send me your check for $5.00.

This is addressed to those members only of the New Mexico Medical Society who are not members of any county society. County society members must pay their dues to the secretary of their county society, and should do so at once, as all reports are supposed to be in my hands not later than April the first.

Trusting I may be relieved of the necessity of writing any one individually on this subject, and looking forward to the present year being the very best the Society has ever had, I am

Most Cordially,
C. M. YATER, Secretary,
Roswell, N. M.

BERNALILLO COUNTY (NEW MEXICO) MEDICAL SOCIETY

On Wednesday, December the third, the Bernalillo County Medical Society elected the following officers:

President - - - - - - Dr. J. A. Reidy
First Vice President - - Dr. C. C. Davis
Second Vice Pres. - Dr. P. G. Cornish, Jr.
Secretary-Treasurer - Dr. L. B. Cohenour
Censors: One for three years, Dr. P. G. Cornish, Sr. One for one year, Dr. W. G. Hope.
Delegates: Three for one year, Drs. L. B. Cohenour, W. A. Gekler, D. C. Dodds. Three for two years, Drs. J. R. Scott, A. H. Vogt, E. E. Royer.

ST. JOSEPH'S HOSPITAL STAFF (Phoenix) DECEMBER MEETING

The regular monthly meeting of St. Joseph's Hospital (Phoenix) Staff was held Saturday, December 20th, in the lecture room of the hospital. Twenty members of the staff were in attendance, with three members of the hospital organization.

The chairman of the staff, Dr. Wylie, stated that the executive committee had decided to present cases for study in a manner which would call forth constructive criticism on a purely impartial basis. They had, therefore, selected three cases of a diversified pathology, and would present a description of them up to the point where the physician or surgeon had to decide on treatment, and would then ask for discussion as to what should be done from that point on, with criticism of the recorded history or diagnosis, if this seemed indicated.

CASE 1.

This was a case of mastoiditis in a Mexican boy, age 13. Seen November 5th, at which time he gave an incomplete history of chill four days before, with pain in left ear and slight discharge. This history of chill was later found to be incorrect.

Examination showed a poorly nourished boy in great pain, the left ear showing small perforation in post-superior quadrant of membrane, which perforation was enlarged releasing a small amount of pulsating serous discharge. There was tenderness over mastoid, very marked in region of tip and emissary vein. Sent for x-ray, with following report:

"Poorly developed cells, fairly dense in outline on both sides. On the left, there is variation in density just behind and below the canal resembling an area of bone destruction in the mastoid process. Regarding this as bone disease, it is probable an acute infection. The lateral sinus comes well forward, being less than one half inch from the posterior wall of bony canal."

Diagnosis of acute fulminating mastoiditis, and sent to hospital. White count was 17,000, 84% polys; next day, count 14,400, 83% polys. Smears from canal showed staphylococci and pneumococci.

Operated Nov. 6th. Cortex thick, mastoid bone small and flat. eburnation extensive around auditory canal; pus and granulation tissue in tip cells; lateral sinus very close to external canal wall; a small area of sinus being exposed; perisinus abscess near knee of sinus; antrum was entered through dense bone, revealing a small amount of granulation tissue and pus in antrum; lower end of sinus covered with what appeared to be healthy granulation tissue. Mastoid was cleaned of all necrotic bone and operation completed in usual manner.

On Nov. 7th, temp. was 99.4, pulse 60; was given mercurochrome and temp. went to 105, coming down gradually nearly to normal. On Nov. 8th, had pain in head, was drowsy and listless; dressing was removed, finding outer wound dry and clean. For three days, temp. stayed around 102.5, with patient drowsy, and pulse 60 to 70. On the 11th, had a chill followed by skyrocket temperature to 105 8; white count 13,600, 88% polys. Much pain in left side of head; neck rigid and tender; Kernig, Babinsky and ankle clonus all positive; pain in ear running back to occiput. Spinal fluid showed increased pressure, 15 cells, no organisms on smear or culture. no excess globulin.

Dr. H. T. Bailey, in opening discussion, said that in a poorly nourished patient with mastoiditis, infection is likely to go through the cells, traversing the bone by the blood vessel route. Also, there may have been some small cells left, with a small amount of pus, and this have been carried back to form an extra-dural abscess. Tenderness down the side of the neck looks like sinus infection; the veins running out from the mastoid process might easily infect the sinus. Some men have stated that total white counts do not mean much, but if you have a high polynuclear count, that points to osseous necrosis. The blood culture was negative; this usually points away from sinus thrombosis; however there might be a clot in the sinus which would wall off the infected part of the thrombus from the general blood stream, so that you can have sinus thrombosis without positive blood culture. Believes he has sinus thrombosis and extradural abscess at this time. Will not discuss the operative procedure indicated.

So far as history goes, this child did not have ear ache at any time preceding mastoid operation. X-ray speaks of eburnation of bone; if there had been infection, this might occur, and would prevent, to a considerable extent, the making of a positive diagnosis from the x-ray.

Dr. J. J. McLoone, who was the surgeon in charge, stated that Dr. Bailey came pretty close to diagnosing the conditions present. Case was atypical; boy came to office with history of earache and discharge for four days. Weak point in the case is the lack of an accurate history, on account of boy not speaking English and there being no adequate interpreter. When the drum was opened and there was so little discharge, was doubtful about there being a mastoiditis, until after the x-ray report. At operation the significant thing was that the greater part of the involvement was away from the middle ear, posterior to the antrum; this is entirely possible, because the most virulent infection follows the gutter cells around to the posterior part of the mastoid process. Lateral sinus was very far forward which made the mastoid infection very likely to involve the sinus. When the temperature went up on the 11th, I thought of the granulations against the lateral sinus. Drs. Schwartz and Mills saw the patient, and agreed that it was a lateral sinus thrombosis with meningeal involvement. He was operated at 11 p. m. Clot was found at the knee and at sigmoid portion of sinus; lateral sinus was exposed over a large area; after clots were removed there was free bleeding; posterior to the sinus there was free pus, (extradural abscess) and considerable necrotic bone. The next day there was some tenderness over the sterno-cleido-mastoid muscle, which is a symptom of considerable importance, though its significance has been minimized by some. At no time was the blood culture positive; this should not be waited for, in fact nothing should be waited for in such cases. We did not even wait to get the consent of the boy's parents in this case. On the following day, we resected about one and a half inches of the internal jugular vein, which was filled with clot. The day following the sinus operation had another chill and another chill after the internal jugular operation. After that, the symptoms improved and he went on to a good recovery, and is now ready to be discharged. (Patient was shown.)

Sinus thrombosis is not necessarily a bacteremia; in this patient comparatively sterile material was being thrown into the circulation. The question naturally arises as to whether the history was wrong and the patient really had been having trouble about which we knew nothing. It illustrates the necessity for an accurate history. If there had been history of chill before operation, would have explored the sinus, and accurate inquiry into the history probably would have revealed that there was a chill. Regarding the question of meningitis, believes that there was an actual localized involvement of the meninges.

CASE 2.

Man, age 30, brought to hospital immediately after injury. Was riding on a railway motor car, which ran into an open switch and patient was thrown some distance, lighting on his head and shoulders.

There were many lacerations about the face and head, with some front teeth gone and apparently complete paralysis of the lower portion of body.

Patient was anesthetized and wounds about the head repaired, and x-ray of spine called for to ascertain extent of injuries to the vertebrae. X-ray report was as follows:

Most serious lesion is in the twelfth dorsal vertebra, which is fractured and rotated backward as well as being dislocated slightly toward the left. There are fractures of the transverse processes of the first, second and third lumbar vertebrae on the left side. There is also fracture of the sixth rib on the left side near the angle, with loose splinters, and pneumothorax of the left lung."

Discussion of the indications in such a case as this, was opened by Dr. G. M. Brockway. He stated that most of the serious accidents on the railways for the past few years in this section have come from the motor cars which run on the rails; next to this the greatest menace to the employees on the trains come from the autos on the highways running into the trains. One thing not mentioned in the history was the extensive scalp injury, this patient being practically scalped without injury to the bone. There was a bulging mass in the lower dorsal region and Dr. Wylie thought he could feel crepitation. He was almost totally paralyzed from the waist down, there was slight movement of toes on stimulating skin of left foot; no sensation of heat or cold below the level of hips. As you ascended toward the navel, he felt sensation. Question arises as to what the injury might be, before x-ray was made, because some cases have to be decided without x-ray. Was it hemorrhage, severance of the cord or compression of the cord? If hemorrhage, where would it be? Pressure on the anterior part of the cord would produce motor paralysis; destruction or pressure on the posterior roots, if slight would produce pain, or if greater, complete anesthesia. Hemorrhage into the substance of cord would be very unusual from such an injury. There would hardly be either extradural or intradural hemorrhage or hemorrhage into the cord substance sufficient to produce complete paralysis. The conclusion naturally arrived at was that there was either almost complete blocking of the cord by pressure from displaced bones, or else a severance of the cord. X-ray films showed the lesion at the 12th dorsal. The cord does not stop at the 12th dorsal, but comes to the lower margin of the first lumbar. Leaves discussion of the indications for treatment to others.

Dr. Smith stated that whatever you do for these injuries you wish you had done something else. The first thing to think of is whether these vertebrae can be reduced by an extension process. Would think a good while before doing laminectomy. Have sweat blood over this sort of case several times and feels loth to venture a suggestion without more than a paper description to go on.

Dr. Sweek said that he saw this patient in consultation and agreed that laminectomy was indicated, and then assisted in the operation. The cord varies somewhat in its termination; in this case it ended about the middle of twelfth thoracic the extreme tip of the cord being injured, the balance of injury being to the cauda. There was marked edema and evidence of injury to tip of cord.

Dr. Brockway stated that three hours after the operation plantar reflexes were present in both feet but 24 hours later, the reflexes had disappeared.

Dr. Watkins called attention to the necessity of examination of the entire dorsal and lumbar spine in such injuries. Request was for the dorsal spine, but following the usual practice, the entire spine was rayed and injuries throughout the lumbar region found. Stated further that he had been frequently impressed with the lack of care in

handling spinal injuries. This patient, from the time he was picked up off the ground, was known to have a spinal injury. Preoperative record made at time the scalp was repaired, said "broken back." Yet he was picked up, laid down again on ambulance cart, picked up again and transferred to hospital cart, picked up and laid on operating table, picked up and laid down on cart again, picked up and laid in bed, picked up and put on cart for transfer to x-ray room picked up and transferred to x-ray table, turned on his side for lateral x-ray, picked up and put on cart, picked up and put to bed, picked up and put on cart for transfer to operating room, turned on his face for laminectomy. Operation showed three laminae fractured, with sharp pieces of bone, and displaced vertebra, mobilized by the injury, all grinding against and into the cord at every manipulation which the patient was subject to. The paralysis prevented the pain which would have caused the patient to object to these movements and would have indicated when they were doing damage. Often thought that if he should suffer a broken back from an auto wreck on the desert, he would be turned gently on his belly, and the surgeon would have to bring operating outfit to that spot and perform the laminectomy then and there. The sooner it is done the better, but the least handling of the patient there is, the less damage to the cord there will be found at operation. The chances are that in every laminectomy done for fractured spine the injury has been multiplied tenfold by the time the patient is laid under the surgeon's knife.

In this connection, Dr. Smith spoke of Dr. Farr's apparatus for handling and moving patients from place to place.

Dr. Wylie stated that he operated this case, with the assistance of Drs. Brockway and Sweek; that Dr. Sweek perhaps may be right about the injury being half an inch above the cauda, but the lower edge of the eleventh vertebra is pretty high for the end of the cord. There was in this case certainly a partial severance of the cord, but the astonishing thing was that the cord could be pinned between the upper back edge of the vertebra below and the lamina above and be partially severed without visible hemorrhage.

Question that had to be decided was what to do in this case. In nearly fifty years of practice in accidental surgery have seen many of these cases and agrees that it does not make any difference what is done, you will wish you had done different. All the laminectomies that have been seen have died and it looks as if this one will die. Likewise all the cases of broken back that were not operated have died. Where there is complete severance of the cord, or whether you have complete paralysis from hemorrhage into the cord, laminectomy is useless. But without laminectomy, it is absolutely impossible to tell what causes the paralysis; you do not know whether it is hemorrhage or not; you cannot possibly tell whether your paralysis is due to pressure without severance. If it is due to pressure and you do a laminectomy you are going to save your patient; if you do not do a laminectomy, in all human probability the man will die. In some cases we can tell that the cord is not severed but the symptoms are due to hemorrhage, either around or into the cord; this is evidenced by the fact that immediately after the injury, motion or feeling was present in some part, and shortly thereafter paralysis develops. Think in the future will give every man with broken spine the benefit of the doubt and do laminectomy. No harm can be done and there is the possibility of saving life.

Dr. Brockway said that he could see no reason for not decompressing the cord, and laminectomy was the only way to do this.

CASE 3.

(Illustrating Management of Diabetes.)

Married woman, age 36, husband and one child living. Entered hospital Nov. 10th in coma. Husband gave history of patient having been diabetic for three years; of being treated in "diabetic hospital" in California until last August. Since then has been on diet with insulin self administered. Four days before entrance complained of sore throat, vomiting and diarrhea; on fourth day went into coma and was brought to hospital.

Physical examination showed both lung bases full of coarse bubbling rales, extending upward back and front nearly to apices. Abdomen distended with gas; dulness in both flanks shifting on change in position; otherwise negative. Catherized urine had sp. gr. 1020, heavy trace of albumen, sugar 1.7%; trace of acetonte; many hyl. and gran. casts. Later specimens showed some pus cells in urine. White count 30,300, 92% polys. Blood sugar 1.04%.

Dr. E. R. Charvoz was asked to open discussion. He stated that this was evidently a diabetic who was going along all right on insulin, when along came an infection which upset the balance and sent her into coma.

Would put patient to bed, get her warm, lavage stomach and colon with soda water, leaving some water in, with order for routine enema every six hours. Would catheterize patient at once and have nurse see if patient could void; have urine examined for sugar, acetone and diacetic acid. Catheterize every three hours if unable to void. If sure that this is diabetic coma, would give thirty units of insulin and at same time about 150 grams of orange juice; repeat in three hours and then every six hours until patient comes out of coma. If she could not swallow the orange juice would give dextrose by rectum,—15 grams in water, using this as routine enema every three hours. If this seemed to fail, would take changes on dextrose and insulin intravenously, but would have to be pretty risky to justify this. Would leave a so-called sugar cushion, giving enough insulin to take care of the acetone and leave some sugar in the urine and the blood sugar above normal during the course of the infection which she seems to have.

Dr. Dysart agreed that in the treatment of coma, would advise that the insulin be given in amounts somewhat less than necessary to rid the blood of excess sugar

Dr C. S. Vivian gave some data about the treatment of this case which presented some difficulties. Dextrose was given intravenously throughout the first and second days, as patient could not swallow; 130 units of insulin was given during first 24 hours, with water intravenously, by rectum and under the skin. Patient became rational on second day and thereafter it became a question of adjusting the carbohydrate diet and insulin. Patient had a very high threshold for sugar, the urine becoming sugar-free while the blood sugar was still very high. In the final adjustment it was necessary to leave the blood sugar around .25%, at which point the urine was practically sugar-free. The urine can be kept sugar-free provided you do not bring the blood sugar down too far; to determine this point, blood sugar determinations are required, with a knowledge of the kidney threshold for sugar. Effort was made to find out whether there was some mechanical explanation for the high kidney threshold, which is sometimes the case; she had a ureteral kink

and some pyelitis. (The daily summary of this patient's treatment for the first week was thrown on the screen by lantern slides.)

Dr. Watkins discussed the importance and significance of blood sugar determinations, stating that this analysis is coming to be one of the major laboratory procedures. The fasting normal person will have about 100 mgms. of sugar per 100 cc. of blood (limits 90 and 120 mgms.). After eating, and especially after taking carbohydrates, there is a temporary rise in blood sugar, lasting an hour or two, then coming back to normal. If the person is unable to metabolize this sugar, the blood sugar content will not return promptly to normal, which fact has led to the "sugar tolerance test" in which the person is fed a measured amount of glucose and the blood tested at intervals of one, two and three hours,—sometimes longer,—for its sugar content. Any person who shows sugar in the blood to the amount of 160 mgms. after a twelve-hour fast should be regarded as a diabetic, whether he has any sugar in the urine or not. In the normal person, when the concentration of sugar in the blood reaches a certain point, the sugar passes through the kidneys and appears in the urine. This point of concentration at which the sugar passes into the urine is called the "kidney threshold." In the normal individual this point of concentration is between 170 and 180 mgms. per 100 c. c. of blood. The renal threshold is a variable factor and cannot be depended on. Some people will leak sugar into the urine at 100 mgms., while others will hold sugar in the blood up to 300 mgms. before any shows in the urine. Therefore, sugar in the urine cannot be depended on to show how carbohydrate is being metabolized, except as a very rough estimate. Nephritis will raise the kidney threshold, as the case just studied illustrates.

Surgeons should realize the importance of determining the blood factors which indicate whether the patients are good operative risks or not; blood sugar is one of the simplest and most significant of these tests. It is not what is being excreted by the patient in urine, sweat or feces that will cause them to succomb after operation, but what is held in the blood. Renal diabetics (those who leak sugar into the urine at a low concentration) are much better surgical risks than are those who have a high blood sugar and none in the urine. The best way to prevent postoperative acidosis,—probably the most frequent cause of postoperative disaster,—is to know which patient is going to have acidosis. The blood sugar on a fasting stomach, or the sugar tolerance test is one of the best methods of determining this.

In this connection, Dr. Greer was asked to present a brief description of a case recently in the hospital, in which some of these points are applicable.

Dr. J. M. Greer (Mesa) stated that the patient is an old lady who, at the time he saw her in consultation, had jaundice, with a large movable abdominal tumor in the epigastric region, with high urine sugar (found by routine test in hospital), and a high blood sugar (.62%). His study of the case makes him think that there may be a pancreatic malignancy, with involvement of the common duct and intermittent obstruction of this duct. The x-ray examination seems to show that the tumor is the gall-bladder, and the tumor is probably a secondary affair, caused by duct obstruction. The question has come up whether to do an exploratory laparotomy at once, or whether to treat her by diet and insulin first.

Dr. B. B. Moeur (Tempe), physician in the above case, stated that the patient called at the office about six weeks ago complaining of intense pain in the stomach; had much distention; when this subsided, could make out the tumor mass a little to the right of midline; in a few days developed jaundice, and was sent to hospital for x-ray, to rule out malignancy of stomach, or find it if present. Her mother died of cancer of stomach. Patient had never suffered like this before. Does not seem cachectic; pulse, temperature and respiration normal.

Dr. Willard Smith stated that if the diagnosis is malignant pancreas, it would be kinder to let the patient die in peace rather in pieces, but he could see no reason for not doing an exploratory laparotomy to satisfy surgical curiosity.

Dr. C. S. Vivian said that the question is whether this patient is likely to go into diabetic coma and die. If the patient were younger, exploratory laparotomy would be indicated. And, as it is, we do not need to fear diabetic coma, because we have means for bringing her out of this. The condition of the circulation is the main thing. The pancreas is concerned with the metabolism of other things besides sugar; if she is on a mixed diet and has a malignant pancreas, she should have incomplete digestion of fats and proteins, which stool examination will show. Would suggest determining the tolerance for carbohydrate, the ability to burn carbohydrate, either by fasting and then building up, or by starting out on a diet and then cutting down the blood sugar with insulin. If she is a severe diabetic and only able to burn a limited amount of carbohydrate with a low tolerance, would hesitate to operate. On the other hand, she may be a mild diabetic, with a tolerance around 80 or 90 grams of carbohydrate, as most diabetics are. A high renal threshold would account for the blood and urine findings. Does not agree that patients with blood sugar of 180 mgms. are always diabetics; this can occur in prostatic disease, with mechanical pressure back on the kidney. Had a patient with blood sugar of 600 mgms. without sugar in urine and without any signs of diabetes.

Dr. O. H. Brown stated that Allen bases his treatment a great deal on the condition of the patient. If the patient is thin and has been on a meagre diet, he gives much smaller doses of insulin. He withdraws the fat at once and makes the point to use moderate doses of soda (10 to 40 grams) in 24 hours. He cautions against the liberal use of soda because of alkalosis. He emphasizes particularly the importance of getting fluids into the patient, fruit juices, water and carbohydrates. The condition of the patient governs the future treatment.

The secretary read a proposed amendment to the constitution which would provide that the executive committee be composed of the chairman, the secretary, the hospital pathologist and four members of the staff elected at the annual meeting, these four members to be distributed as far as practicable among the various branches of medical practice. It was announced that the next meeting would be the annual meeting, at which time staff officers would be elected for the year 1925.

W. WARNER WATKINS,
Secretary.

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The personnel of the firm has not been changed and several of our employees have been taken into the corporation.

Thanking you for your many favors and hoping the continuation of the same for the new corporation, we remain

Very Truly Yours,

Directors of New Corporation
S. W. ROOT, Pres.
E. W. BEESON, Vice-Pres.
F. P. KENISTON, Vice-Pres.
G. N. WALKER, Sec'y.

KENISTON & ROOT
F. P. KENISTON
S. W. ROOT

418 W. 6th ST. LOS ANGELES, CALIF.

INFANT DIET MEAD'S MATERIALS

INFANT FEEDING

THE PHYSICIAN HIMSELF is the most important factor in the successful feeding of infants.

BUT TWO OTHER FACTORS ENTER into the equation—

THE MOST IMPORTANT BEING the physician's control of the case;

AND NEXT IN IMPORTANCE the reliability of his infant diet materials.

MEAD'S INFANT DIET MATERIALS satisfy this last requirement. They are as reliable as it is possible for us to make them;

BUT THEIR INDIRECT INFLUENCE on the other requirement, the doctor's control over the feeding case, is even of greater value.

MEAD'S INFANT DIET MATERIALS are marketed to the laity only on the physician's prescription—No feeding directions accompany trade packages—The mother gets her information only from the doctor who changes the feedings from time to time to meet the nutritional requirements of the growing baby. *He therefore CONTROLS the case.*

THE PHYSICIAN can, with three MEAD diet materials, plus his skill and his control, satisfy the nutritional requirements of nearly all infants entrusted to his care.

MEAD'S DEXTRI-MALTOSE (carbohydrate) cow's milk and water, combined in proportions to suit the individual baby, meets successfully the requirements of most infants.

FOR OTHER INFANTS where additional carbohydrate is not indicated but additional protein is indicated (such as in Diarrhoea, Marasmus, Colic in breast-fed infants, etc.), the use of CASEC (protein) in the cow's milk modification gives gratifying results.

MEAD'S COD LIVER OIL, a standardized antirachitic agent of known potency, protects all infants, whether breast or bottle fed, from Rickets and can be given in such small doses as not to upset the fat proportion of the baby's diet.

Samples and literature describing these three diet materials

MEAD'S DEXTRI-MALTOSE · MEAD'S STANDARDIZED COD LIVER OIL
MEAD'S CASEC *Sent at the physician's request*

MEAD JOHNSON & COMPANY
MAKERS OF INFANT DIET MATERIALS
EVANSVILLE, INDIANA, U. S. A.

MEAD'S DEXTRI-MALTOSE

Toxin Antitoxin (*Lederle*)

For Immunization

Against Diphtheria

Park conclusively demonstrated the value of diphtheria immunization with Toxin-Antitoxin Mixture. Immunity still persists in over 90% of children immunized six years ago.

Toxin-Antitoxin (Lederle) is made according to Park's modified formula, containing one-tenth L plus dose of toxin.

Studies during the past two years show that no severe reactions followed the use of this modified formula either in children or adults. This product therefore permits of universal immunization against diphtheria.

Lederle Antitoxin Laboratories

511 Fifth Avenue,

New York City